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Canon

CAMERA MANUAL

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Canon
EOS
5D
Mark IV

Discover new ways to capture stunning images with our creative projects

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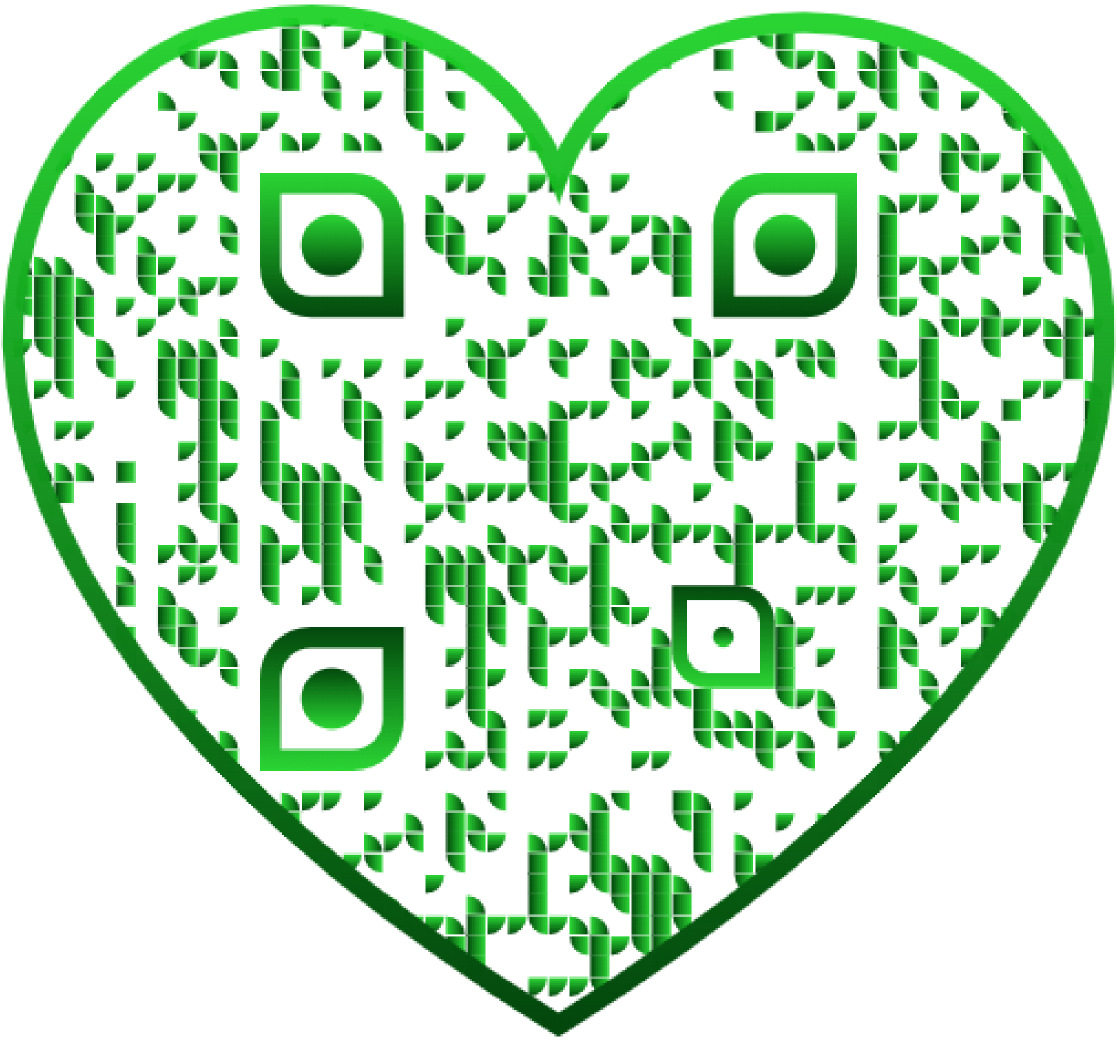

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Papercut's

Canon

CAMERA MANUAL

Discover how to get the best from your Canon Camera! For amateur and professional alike, the Canon EOS range gives you the ability to tell your story and express your creativity through the power of the image. Digital cameras have exploded in popularity in recent years and the level of innovation and technical advancement at the photographer's disposal is beyond compare. The range of equipment available within the EOS system is vast, which can be overwhelming if you are new to Canon. The aim is simple: we want to help guide you so you can make the best informed choice about which camera, lens or accessory is right for you. Moreover, we want to show you a number of projects that were all undertaken with Canon equipment, so you can better understand how to get the absolute best out of your gear. Whether you are just looking to improve your holiday snaps, develop more skills as a creative photographer or searching for some interesting wet weather projects, we have something for everyone.

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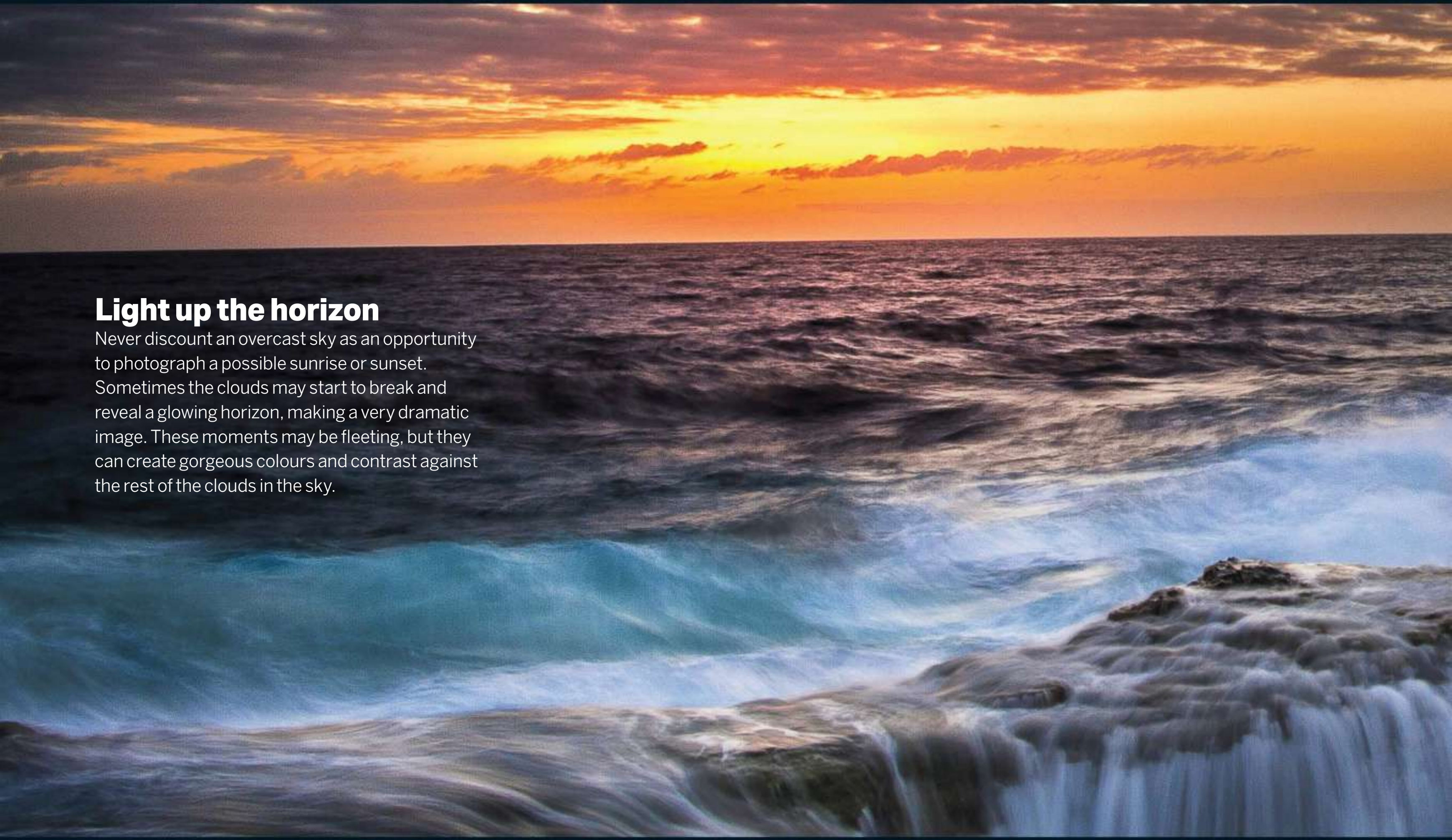
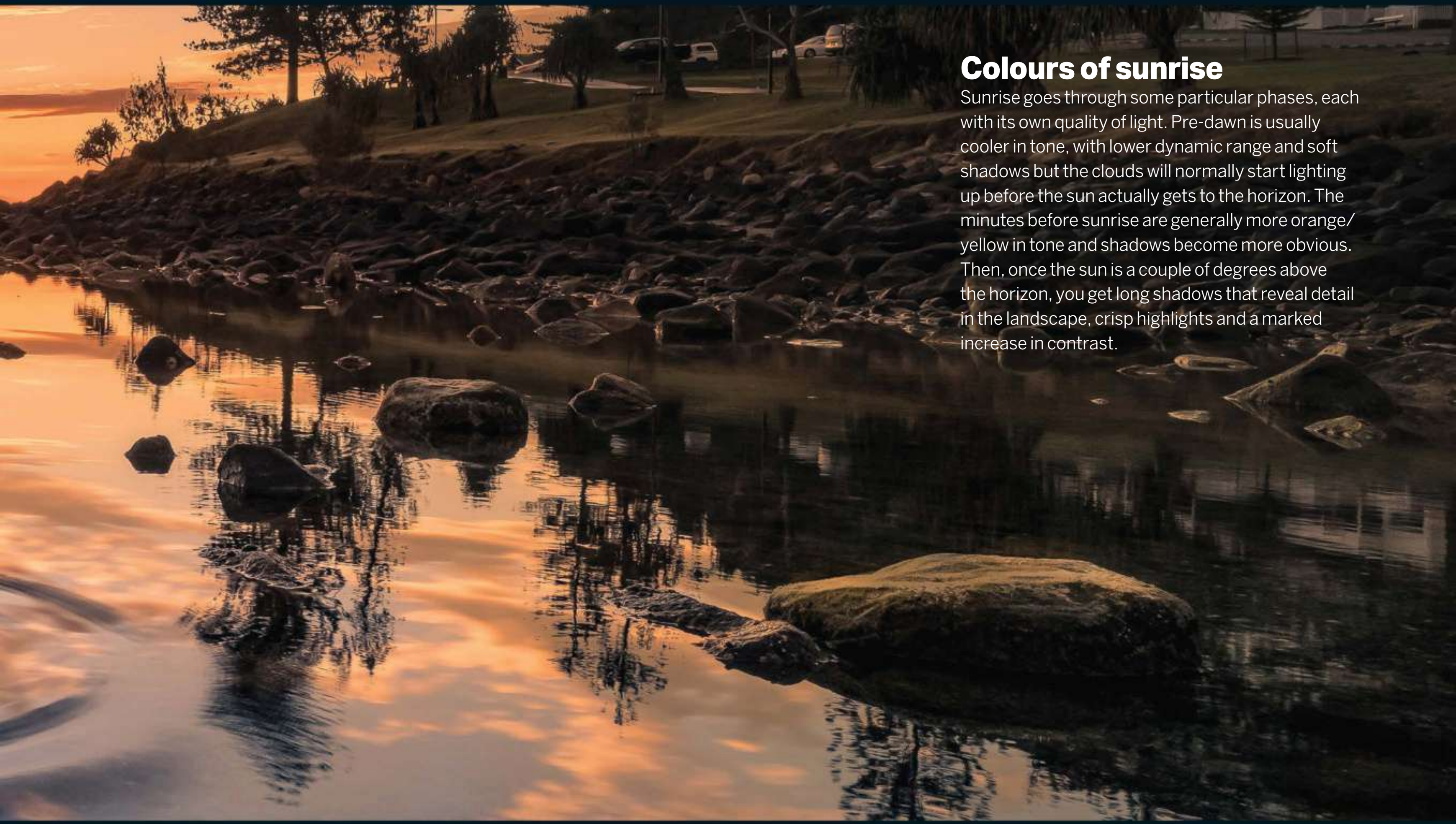
Photoshop
Photo Editing
For Photographers
EXPAND



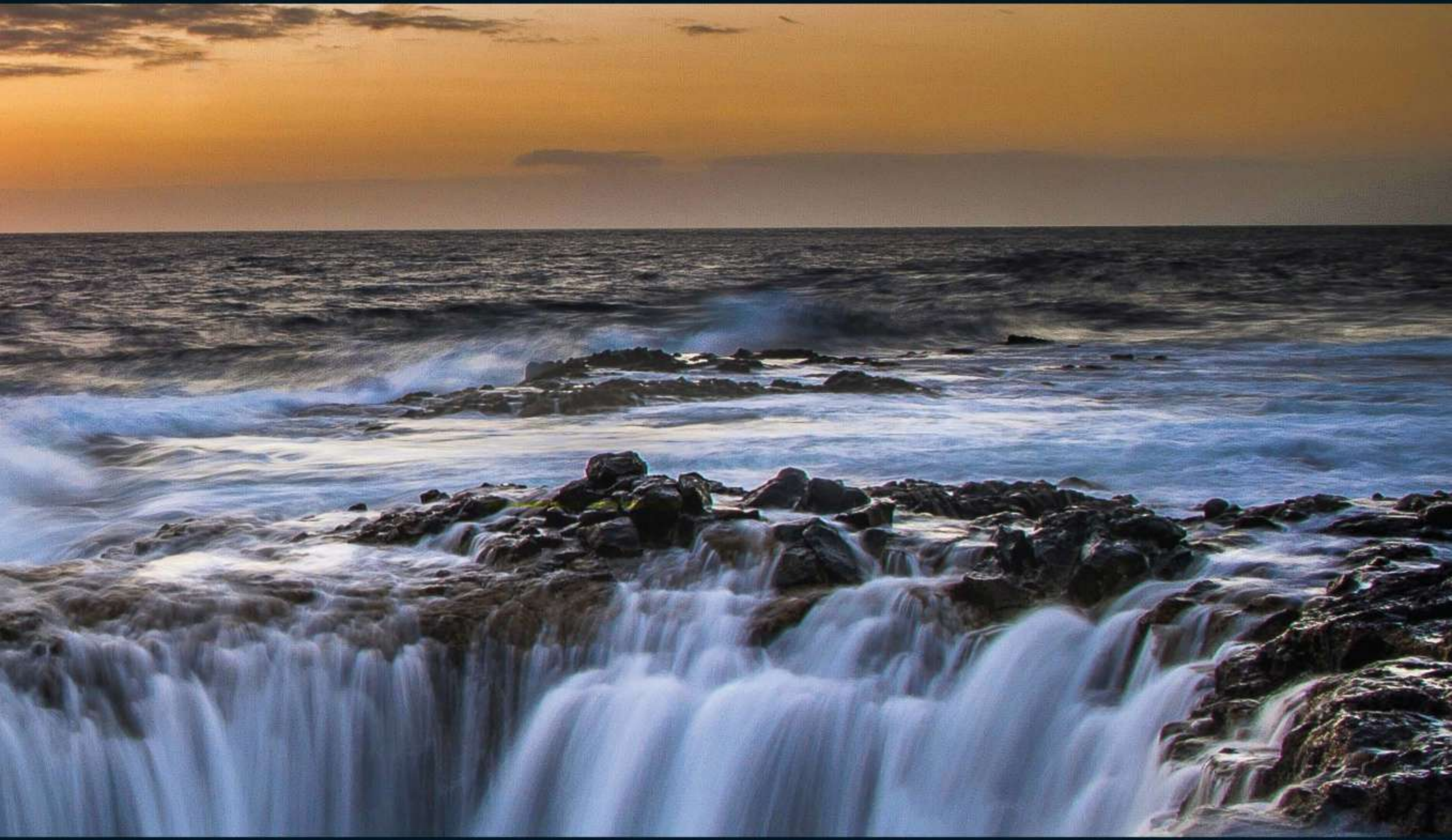
Light up the horizon

Never discount an overcast sky as an opportunity to photograph a possible sunrise or sunset. Sometimes the clouds may start to break and reveal a glowing horizon, making a very dramatic image. These moments may be fleeting, but they can create gorgeous colours and contrast against the rest of the clouds in the sky.



Colours of sunrise

Sunrise goes through some particular phases, each with its own quality of light. Pre-dawn is usually cooler in tone, with lower dynamic range and soft shadows but the clouds will normally start lighting up before the sun actually gets to the horizon. The minutes before sunrise are generally more orange/yellow in tone and shadows become more obvious. Then, once the sun is a couple of degrees above the horizon, you get long shadows that reveal detail in the landscape, crisp highlights and a marked increase in contrast.



CANON GEAR GUIDE

Your essential guide to Canon cameras and equipment

Whether you are a beginner, an enthusiast or a seasoned professional, Canon's range of cameras and accessories means that there is something for everyone. From stylish compact cameras, to entry level DSLRs and top of the range professional equipment; the range available to choose from is huge. Over the following pages we'll take a look at the primary Canon range with easy at a glance specifications to help you decide which type of camera is right for you, along with some pros and cons to help refine your choices. We'll also cover Canon lenses and Speedlite flashes to complete your essential photography kit.

Photography is all about how you capture light. With a Canon camera, you have the chance to produce powerful and beautiful images. You also have a gateway to fun and creativity, and it begins here. ■

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Canon
EOS
5D
Mark IV
24-70mm
ULTRASONIC
EF 24-70mm 1:2.8 L USM
Canon

> "With a Canon camera, you have the chance to produce powerful and beautiful images. You also have a gateway to fun and creativity, and it begins here."

Anatomy of a DSLR

What goes on at the front of a Canon DSLR?

If you're serious about your photography then sooner or later you're going to want a digital SLR. Despite all the improvements in advanced compact, super-zoom or compact system camera design, in terms of image quality, performance and creative versatility the digital SLR still beats almost every other type of camera hands down. There are some top-end pro cameras costing tens of thousands of pounds which can take better pictures, but frankly if you're considering one of those then you're reading the wrong book.

The acronym "SLR" stands for "single lens reflex". The "single lens" part is to differentiate them from the twin-lens cameras that were popular in the 1960s, while the "reflex" part refers to the reflex mirror, an angled movable mirror that sits in front of the sensor and directs incoming light to the camera's viewfinder. The mirror moves out of the way when a picture is taken, making that distinctive "click-clack" noise.

Only a few years ago digital SLRs were the exclusive preserve of wealthy enthusiasts and top professionals, but thanks to keen competition between the manufacturers and increasing popularity, the price of entry-level DSLRs has tumbled and it is now possible to buy a good basic digital SLR complete with a standard zoom lens without breaking the bank, and even mid-range models are under £600 body-only.

The very top professional DSLRs such as the Canon EOS-1DX Mark II still cost thousands, but then we've all got to have something to aspire to, haven't we? ■

Canon
EOS
5D
Mark II
CANON EF LENS
24mm 1:1.4 L
⌀77mm

1 Reflex mirror

The reflex mirror is what gives the Single-Lens Reflex (SLR) camera its name. Light coming in via the lens is split by this mirror, with most going upwards into the viewfinder, while a smaller proportion is allowed through a central part-silvered area and directed to the autofocus system. The reflex mirror flips up out of the light path when the shutter is triggered, producing that distinctive "click-clack" sound that all SLRs make.

2 Sensor

This is the picture-taking element at the heart of the camera. It consists of a wafer of silicon embedded with millions of tiny photocells that produce electrical charge when exposed to light. The sensor in this Canon EOS 5D Mk II measures 36 x 24mm (the same as a frame of 35mm film) and has 21,100,000 individual photocells.

3 Image processor

The electronic circuitry inside the camera takes the individual charge signals from the photocells on the sensor and converts them into a digital image. Modern advanced processors such as the Canon DIGIC 4 in this EOS 5D Mk II are amazingly fast, and also apply sophisticated noise reduction algorithms.

4 Focusing screen

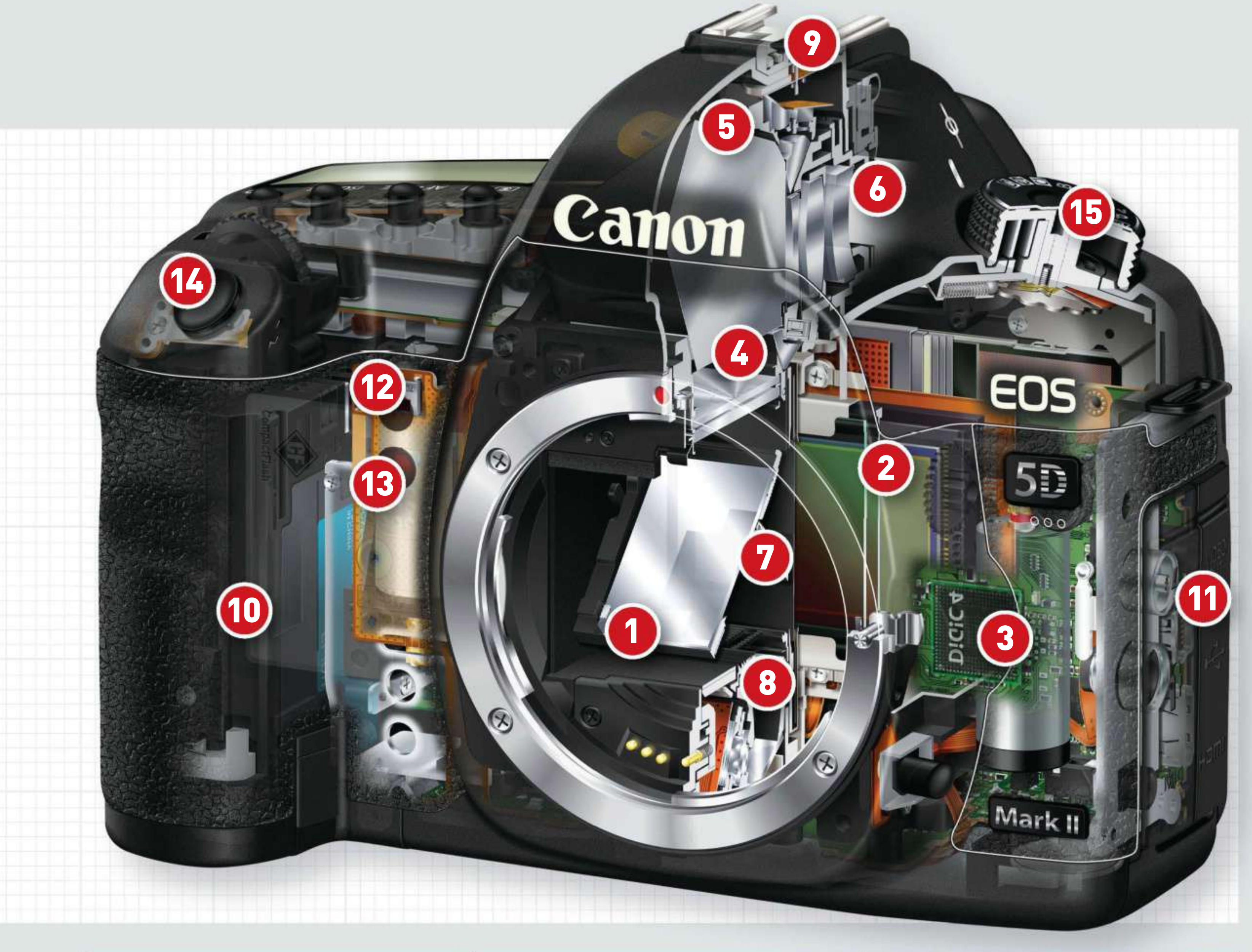
This consists of a ground-glass screen onto which the image seen by the lens is reflected via the reflex mirror. On advanced DSLRs such as this EOS 5D Mk II the focusing screen can be changed for one with grid lines or targeting reticules for specialist applications such as forensic or architectural photography.

5 Pentaprism

This takes the light from the focusing screen and bends it through 90 degrees, directing it into the viewfinder eyepiece. Some cameras have a mirror in this position instead. It is the position of the pentaprism that gives SLRs their distinctive shape.

6 Viewfinder

The defining characteristic of an SLR camera is an optical viewfinder that shows the view through the lens (TTL). Data such as focus points and exposure information are also shown in the viewfinder on a separate LED display. Optical viewfinders are generally considered to be superior to electronic ones.



7 Autofocus mirror
An area in the middle of the reflex mirror is partially transparent, allowing some light through onto a second mirror. This directs some of the incoming light downwards onto the autofocus sensor. This mirror also folds up out of the way when a shot is taken.

8 Autofocus sensor
Some of the light coming in via the lens is directed onto the autofocus sensor. Digital SLRs use a type of autofocus called "phase detection", which is inherently better and faster than the "contrast detection" systems used in compact and super-zoom cameras.

9 Light meter system
Some of the light directed towards the viewfinder is diverted to the light metering system. Modern digital SLRs have sophisticated multi-point light meters that can rapidly analyse a scene and calculate the exposure setting.

10 Battery
Digital SLRs are powered by larger, higher-capacity batteries than most other types of camera. Since the monitor screen isn't in constant use, this gives most DSLRs excellent battery duration, a vital feature if you are using the camera in a professional capacity.

11 Connectivity
Modern cameras have a wide range of connectivity options. This Canon EOS 5D Mk II features USB 2.0 and HDMI as well as a dedicated composite video output connector, all hidden under a weatherproof rubber hatch.

12 IR remote sensor
Most digital SLRs have an optional infra-red remote control for long-range shutter release, much more convenient than the old cable or bulb release gadgets.

13 Self-timer indicator
Even a pro camera like the 5D Mk II can be used for family shots. The LED indicator blinks to mark the countdown for a self-timer shot.

14 Shutter button
Most digital SLRs incorporate a chunky handgrip, usually with the shutter button and adjustment wheel located on the top or front. As with compact cameras a half-press of the shutter button activates the metering and AF systems. DSLR shutters are designed to be used hundreds of thousands of times.

15 External controls
Cameras intended for professional use are built to a more exacting standard, and incorporate weatherproof environmental seals on all the hatches and controls, keeping out dust and moisture.

Anatomy of a DSLR

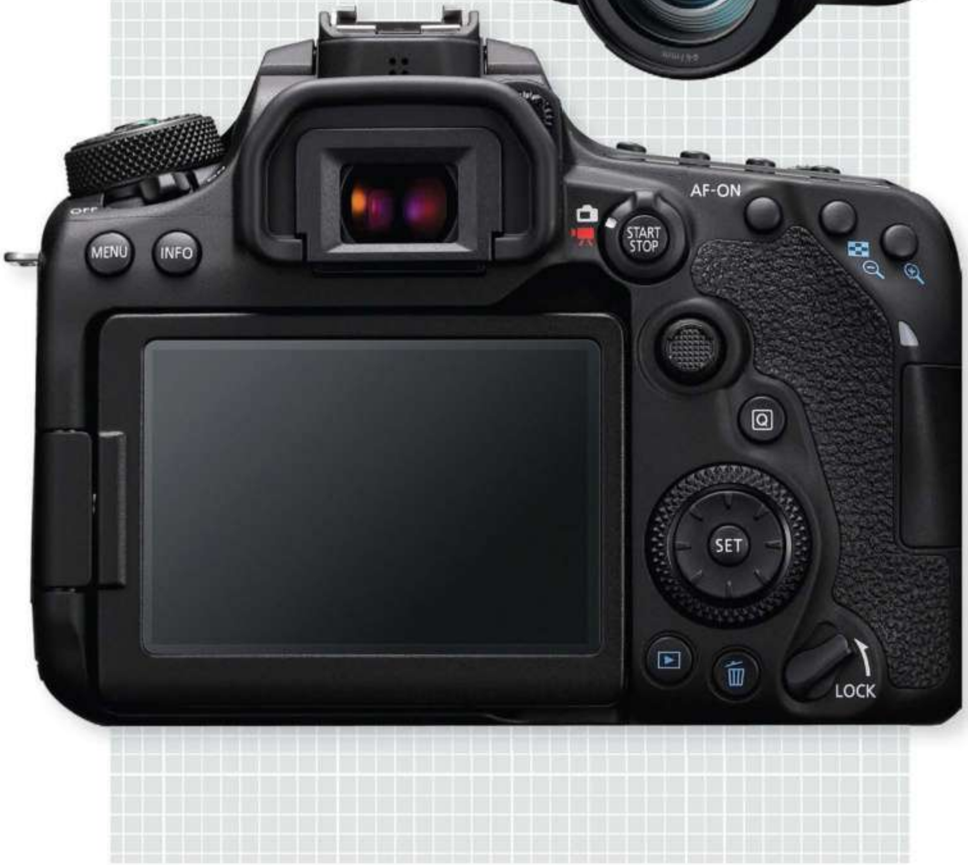
What goes on at the back of a Canon DSLR?

All DSLRs have a full range of manual functions, and generally have a much wider range of control than even the best super-zooms or advanced compact cameras. DSLR sensors range from 12 megapixels up to over 25 megapixels, and are physically larger than the sensors in compact and bridge cameras, giving them a number of advantages in terms of image quality.

The majority of Canon digital SLRs use a sensor size known as APS-C, roughly half the size of a frame of 35mm film. They are typically around 24 x 16mm, while the advanced professional DSLRs use 'full-frame' sensors. These are the same size as a frame of 35mm film.

All Canon digital SLRs have interchangeable lenses and a wide range of accessories, such as external flashguns, extra battery packs, Wi-Fi transmitters and other gadgets. ■

Canon
EOS
90D



1 Monitor screen

Since DSLRs have optical viewfinders, the monitor screen is used mainly for menu functions and image playback. However most recent digital SLRs do have the option of live monitor view, very useful for shooting at awkward angles when you can't use the viewfinder. Most digital SLR monitors are very large, typically 3.5 inches with a resolution of at least 430,000 dots.

2 Viewfinder eyepiece

The eyepiece is cushioned and protected by a soft rubber frame which can be removed to make room for accessories such as an eyepiece cover or a magnifying finder.

3 Viewfinder optical correction

Most DSLR viewfinders include manual optical adjustment to compensate for long or short-sightedness, so that you can use your camera without needing to wear your glasses.

4 Flash hot-shoe

All digital SLRs have a hot-shoe for mounting an external flashgun. The contacts in the shoe provide a switch to synchronise the flash with the camera's shutter, but more sophisticated flashguns usually from the same brand as the camera can use extra contacts to link up with the camera's exposure metering system, to ensure perfectly exposed flash shots.

5 Pop-up flash

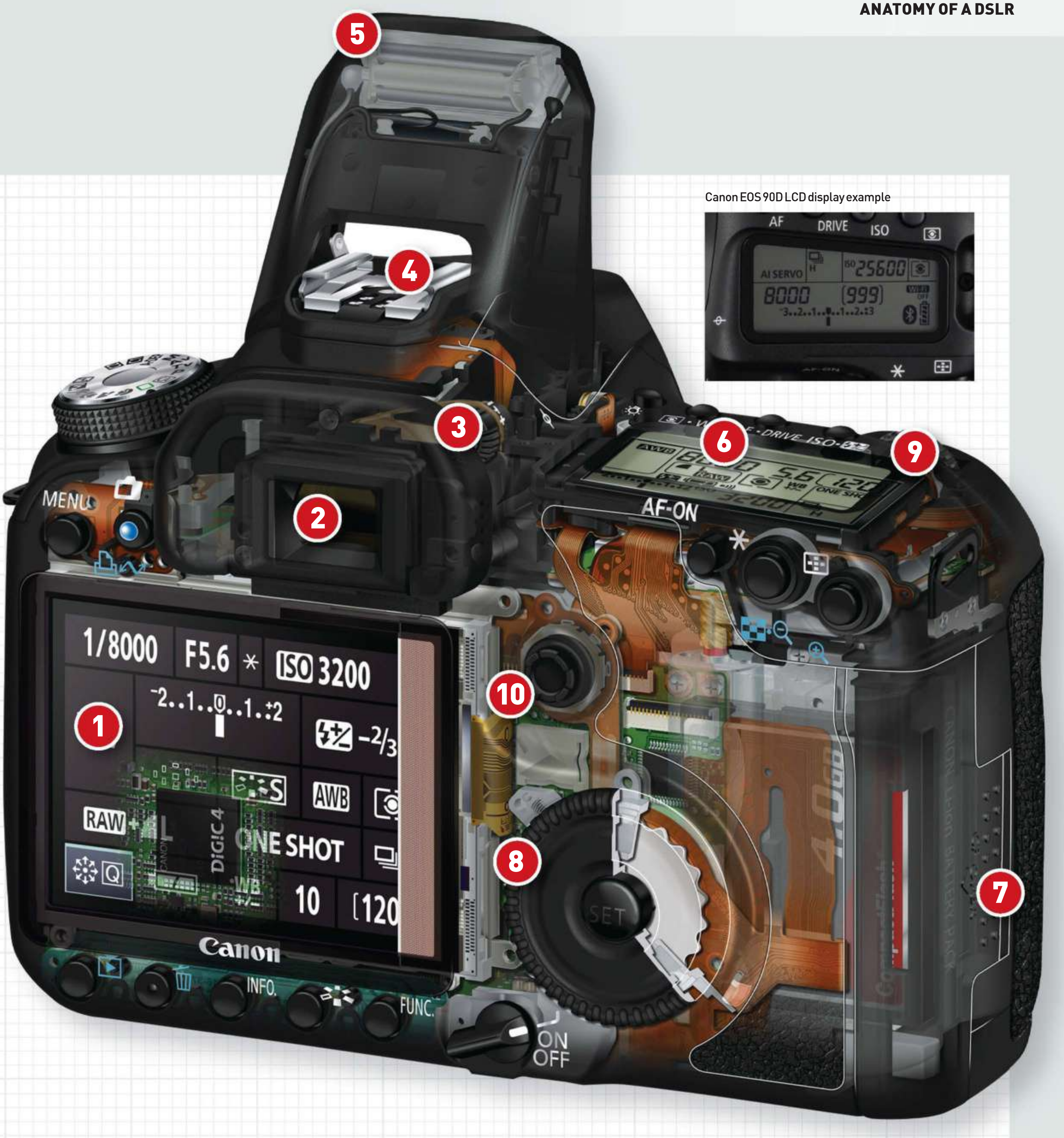
Most entry-level and mid-range digital SLRs have a pop-up flash mounted above the pentaprism. These are usually relatively weak, with a maximum range of only a few metres, and are no substitute for a good external flashgun, but they are useful as a fill-in light for backlit portraits.

6 LCD display

Most top-end DSLR models have a separate LCD data display showing things like exposure information, camera settings, remaining storage capacity and battery duration. They are usually back-lit so you can read them in the dark.

7 Memory card slot

While a few years ago most DSLRs used CompactFlash memory cards, these days the vast majority use SD cards for storage. They are smaller, lighter and cheaper, and in some cases faster too.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OFF
Canon
DIGIC 4
1/8000
F5.6
ISO 3200
ONE SHOT
AF
DRIVE
ISO
AI SERVO
25600
8000
(999)

Canon EOS 90D LCD display example

8 External controls

Digital SLRs have a much wider range of controls than even advanced compact cameras and the function of many of them can be customised to suit the user. On this Canon EOS 50D mid-range DSLR the exposure is adjusted via this large rear dial and the smaller roller wheel on the top of the handgrip.

9 Adjustment wheel

Most digital SLRs will have one or two of these, usually positioned within easy reach of the right thumb and forefinger. They are used for adjusting exposure values and some numerical exposure settings.

10 Menu control

Most digital SLRs, and particularly the more advanced models, have extensive and comprehensive menu interfaces, with many screens of customisable options and adjustments. Most have a dedicated menu navigation control, either a D-pad or, in the case of this EOS 50D, a small joystick.

Compact digital cameras

The next level of simplicity, shooting and sharing

Canon
CANON ZOOM LENS 4.2x IS
8.8-36.8mm 1:1.8-2.8
G7X

If you seek something easy to use but still powerful, sleek and stylish, then Canon's range of compact cameras is where you can find your perfect device. Canon's innovative technologies are the backbone of the PowerShot and IXUS range of compact digital cameras that take you to the next level of shooting and sharing beautiful photos and HD quality movies.

From the ultra-compact, to the versatile and affordable, you will no doubt find something that suits your pocket and your lifestyle. Here is just a sample of the digital compact camera range, that will get you inspired and ready to share your precious memories. ■

CANON LENS
6.6mm F2.8

Canon PowerShot ZOOM

£289/$382/€342

A pocket-sized zoom monocular with stills and HD video.

- 1/3-inch CMOS sensor
- 12.1MP effective resolution
- Full HD video recording
- DIGIC 8 image processor
- 100/400/800mm focal lengths
- 4-axis optical stabilisation
- 0.39-inch EVF OLED viewfinder
- Stereo microphone
- USB-C charging
- Wi-Fi & Bluetooth connectivity

Pros: Pocket-sized and lightweight. Super-telephoto zoom range.
Cons: Limited resolution. No monitor.

★★★★½ 4.5

Canon PowerShot V10

£339/$449/€400

A dedicated 4K v-logging camera that fits in your pocket.

- 4K UHD video at 30fps
- 1.0 back-illuminated CMOS sensor
- 13.1MP for video, 15.2MP for stills
- 19mm-equivalent wide angle
- Stereo microphones
- Built-in stand
- 2.0in tilting monitor
- Face-tracking technology
- Digital image stabilisation
- Wi-Fi & Bluetooth connectivity

Pros: Amazing sound and video quality. Compact size. Light weight.
Cons: Limited stills capability. No optical zoom.

★★★★½ 4.5

Canon PowerShot G7 X III

£699/$749/€766

A smart and small, multimedia compact.

- 1.0-type stacked sensor
- 20.1MP effective pixels
- DIGIC 8 image processor
- 4.2X zoom lens
- RAW burst mode 30fps
- Bluetooth & Wi-Fi connectivity
- 4K movie
- 120fps high frame rate movie
- Vertical movie
- 3.0 inch LCD touchscreen

Pros: A nice, responsive touchscreen. Good handling and build quality.
Cons: AF system is a bit outdated. No viewfinder built in. No hot-shoe.

★★½☆☆ 2.5

Canon PowerShot G5 X II

£800/$899/€805

All the power and portability you need in a camera.

- 1.0-type stacked sensor
- 20.1MP effective pixels
- DIGIC 8 image processor
- Superb 5x zoom lens
- Fast f/1.8-2.8 aperture
- Pop-up electronic viewfinder
- 4K movie
- 120fps high frame rate movie
- Bluetooth & Wi-Fi connectivity

Pros: Great overall image quality. Well made. Responsive handling.
Cons: Battery life is sub par. Soft lens wide open. Quite expensive.

★★★★½ 4.5

Canon PowerShot SX740 HS

£499/$660/€590

A pocket-sized travel camera with 40x zoom.

TOP PICK

- 1/2.3 back-illuminated CMOS sensor
- 20.3MP effective resolution
- DIGIC 8 image processor
- 24mm-equivalent wide angle
- 40X optical zoom
- 10fps continuous shooting
- 3.0 inch vari-angle monitor
- Built-in flash range 5.0m
- 4K 25fps movie
- Wi-Fi & Bluetooth connectivity

Pros: Compact size. 40x optical zoom. Full manual controls.
Cons: Limited flash range. Only 25fps at 4K.

★★★★★ 5.0

Canon PowerShot SX70 HS

£579/$766/€686

Powerful super-zoom with SLR-like handling.

- 1/2.3 back-illuminated CMOS sensor
- 20.3MP effective pixels
- DIGIC 8 image processor
- 21mm-equivalent wide angle
- 65X optical zoom
- 10fps continuous shooting
- 4K 30fps movie
- 3.0 inch vari-angle monitor
- Built-in flash range 6.5ms

Pros: Amazing zoom range. SLR-like handling. Vari-angle monitor
Cons: A bit bulky at 610g. No hot-shoe for external flash.

★★★★☆ 4.0

Canon PowerShot G1 X III

£1149/$1099/€1210

Premium quality and expert control.

- APS-C CMOS sensor
- 24.2MP effective pixels
- DIGIC 7 image processor
- 15-45mm f/2.8 - f/5.6 zoom lens
- 3x optical zoom
- 6x ZoomPlus
- 49-point AF system
- 2,360,000 dot OLED EVF
- 7.5cm vari-angle LCD touchscreen

Pros: Great image quality. Intuitive control layout. Weather sealing.
Cons: No 4K video capability. Battery does not last. Limited lens.

★★★★½ 4.5

Canon Zoemini instant cameras and printers

Fun, fast, on-the-go photography and printing

Canon
Zoemini S2
Canon
Zoemini S2
Canon
Zoemini S2
TAKE 2

If you are a self-confessed selfie addict and love to share photos with your friends and loved ones, then you need something that is stylish, portable, and can give you instant results with the minimum of fuss. For every special moment that needs to be captured, you can have a camera and printer small enough to fit in your pocket and with such a compact system, it has never been easier to shoot and print on the go. Canon offers several options that range from 2-in-1 models with cameras and printers built in, to the option to use a portable printer that connects to your mobile devices for on-the-spot image capture and printing, just when you need it.

> *"For every special moment that needs to be captured, you can have a camera and printer small enough to fit in your pocket..."*

You might wonder how it is possible to build a printer into a compact camera and make it small enough to fit in the palm of your hand. It's all made possible by Canon's ZINK Zero Ink photo paper. ZINK paper is infused with a layer of micro crystals that react when heat is applied by the device. If you've ever had a receipt printed in your local store, it's a colour version of that technology. Let's be honest, it isn't archival quality, but it is a great little toy for creating prints instantly.

There are currently two Zoemini devices that you can choose from, depending on your needs. The basic Zoemini 2 is just a printer with a 10 sheet capacity that connects to your smart device via the Canon Mini Print app. Next up is the Zoemini S2, which lets you both capture and print from the same device, incorporating a 8MP camera and 2x3" ZINK paper prints. Both options provide high quaity 314 x 600dpi resolution prints. It's all you need for snaps on the go. ■

Zoemini S2

£109/$144/€129

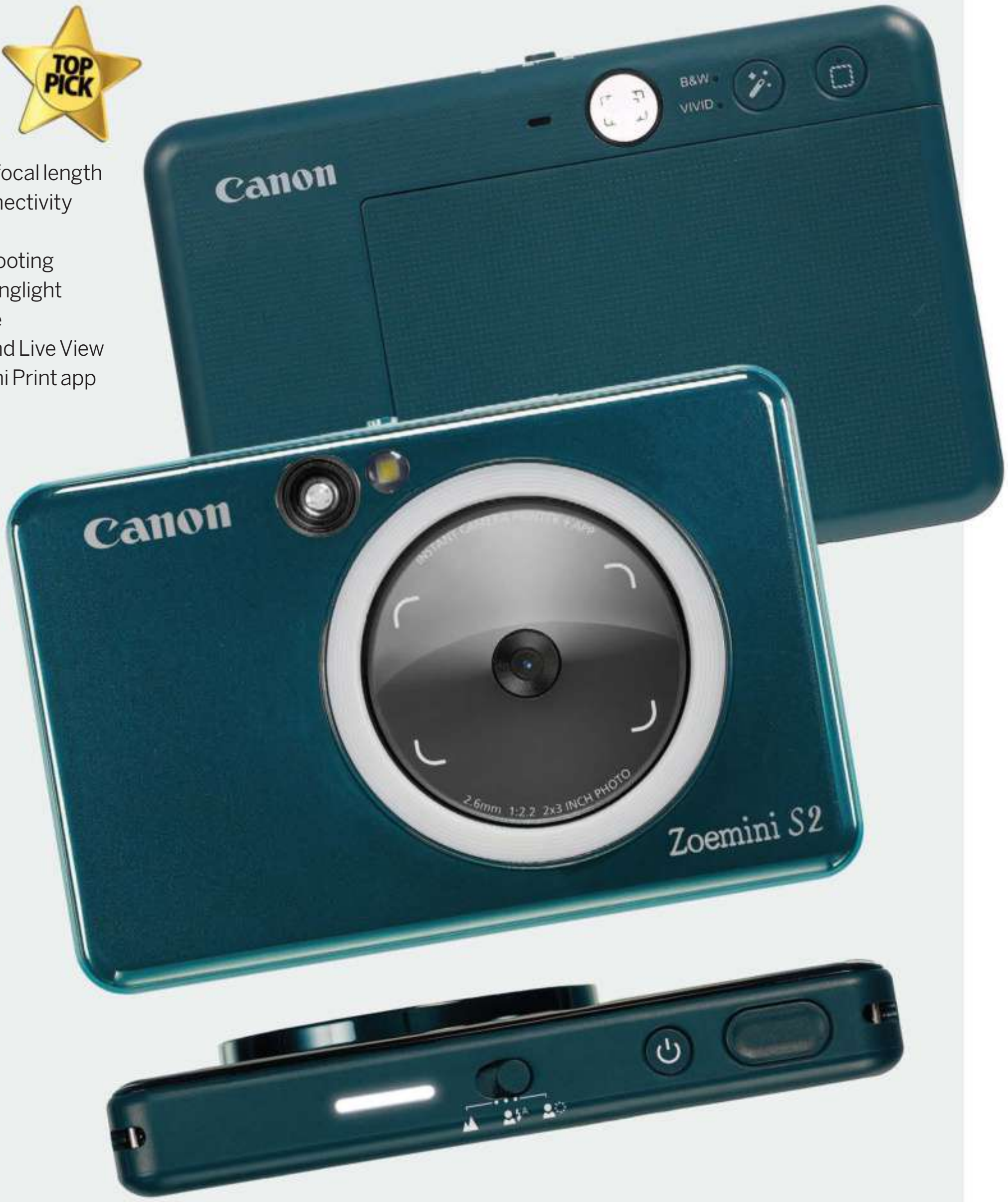
(US Ivy Cliq+2)

Instant prints of your selfies, with a built-in ring light.

TOP PICK

- 10-sheet print capacity
- Prints in 50 seconds
- 314 x 600 dpi print resolution
- 2in x 3in print size
- 8MP camera sensor
- 1.0m LED ring-light flash range
- Available in Pearl White, Dark Teal or Rose Gold
- 25mm equivalent focal length
- Bluetooth 5.0 connectivity
- Micro SD storage
- App-controlled shooting
- Selfie mirror and ringlight
- 25 print battery life
- Remote Shutter and Live View with the Canon Mini Print app

Pros: Instant prints. Small size and weight. Simple to use.
Cons: Limited battery life. Print head durability.


Canon
B&W
VIVID
Canon
2.6mm 1:2.2 2x3 INCH PHOTO
Zoemini S2

★★★★★ 5.0

Zoemini 2

£139/$184/€164

(US Ivy 2)

Pocket-sized, ink-free and ready to print your photos anytime.

- 10-sheet print capacity
- Prints in 50 seconds
- 314 x 600 dpi print resolution
- 2in x 3in print size
- USB-C charging
- Bluetooth 5.0 connectivity
- Borderless printing
- Canon Mini Print App
- Size 120 x 84 x 21.5mm
- Weight 177g
- Available in Pearl White, Navy Blue or Rose Gold

Pros: Ultra-portable. High print quality. Fun.
Cons: Limited battery life. Small print capacity.

Canon
Zoemini 2
Canon
Zoemini 2
#friends
#werule
#smile
#bffs
#squadgoals

★★★★☆ 4.0

Canon EOS for beginners

New creative photographic opportunities await

> *"Turn snaps and video clips into something far more wonderful: images and footage that you are proud of and want the world to see."*

Take more creative control of your photography with a range of digital cameras for enthusiasts that are as easy to use as you need them to be, with image quality that is sure to impress. Turn snaps and video clips into something far more wonderful: images and footage that you are proud of and want the world to see. Use high-end techniques such as shallow depth of field to create differential focus and draw your viewer's eye to your subject. Make your images distinctive with the use of creative filter effects that can all be done in-camera with the touch of a button.

Take command of your camera with controls that are easy and intuitive. Touchscreen LCDs give you greater access to your camera's functions and shooting modes. You can even focus and take photos with just a tap of the screen. All you favourite moments can be captured with responsive cameras that can rapidly autofocus so you never miss a shot.

You even have an on-screen guide to various features of your camera. The guide provides descriptions of many of the camera functions along with helpful advice on how to use them. Now you can shoot in confidence. ■

Canon EOS M50 Mark II

£458/$607/€543 (body only)

Packed full of feature for content creators.

TOP PICK

- 22.3 x 14.9mm CMOS sensorr
- 24.1MP effective resolution
- DIGIC 8 image processor
- EF-M lens mount
- Dual Pixel CMOS AF System
- 0.39-type OLED Electronic Viewfinder
- 7.5 cm Touchscreen vari-angle monitor
- Full manual controls
- 4k video at 25fps, Full HD at 60fps

Pros: Great video features. Compact, lightweight and very portable.

Cons: Might be limiting for experienced users.

★★★★★ 5.0

Canon EOS 850D

£720/$954/€854 (body only)

A budget-priced all-rounder for filmmaking and photography.

- 22.3 x 14.9mm CMOS sensor
- 24.1MP effective resolution
- DIGIC 8 image processor
- EF/EF-S lens mount
- Optical viewfinder
- 5-axis Digital Movie image stabilisation
- 45 f/5.6 cross-type AF points
- 7.5 cm vari-angle monitor
- 4k video at 25fps, Full HD at 60fps

Pros: Excellent features and performance for the price.

Cons: Older model, may be discontinued soon.

★★★★½ 4.5

Canon EOS M6 II

£899/$994/€1099

Lightweight, but powerful, camera for superb images.

- APS-C sensor
- 32.5MP effective pixels
- 180° tilting touchscreen
- DIGIC 8 image processor
- UHD and Full HD
- 14fps continuous shooting
- Bluetooth & Wi-Fi connectivity
- 5,481 selectable AF positions
- ISO range of 100-25600

Pros: High-resolution 32.5MP sensor. 4K video. Manual/Auto focus switch.
Cons: EF-M range of lenses is limited. EVF is an optional add-on.

★★★★☆ 4.0

Canon EOS 250D (US Rebel SL3, Japan Kiss X10)

£529/$549/€556

The world's lightest DSLR.

- 24.1MP APS-C sensor
- 4K movies at 25fps
- 5fps continuous shooting
- +/-5 EV exposure compensation
- ISO range from 100-51200
- DIGIC 8 processing
- 1040k vari-angle touchscreen
- Wi-Fi and Bluetooth connectivity
- 63-zone dual layer metering

Pros: Extremely lightweight construction. Great price. 4K video.
Cons: Viewfinder coverage poor. Only 9 AF points. Cropped video.

★★★★½ 4.5

Canon EOS 4000D (US Rebel T100)

£249/$329 (body only)

Affordable DSLR photography.

- 18MP APS-C sensor
- Optical viewfinder With 9 point AF
- 6.8cm 230,000 dot LCD monitor
- Built-in flash
- 3fps continuous shooting
- DIGIC 4+ image processor
- Full HD video capture
- Creative filters
- ISO range 100-12800

Pros: High resolution sensor. User friendly. Built-in Wi-Fi
Cons: No vari-angle screen. No 4K video capture. Only 3fps continuous shooting.

★★★★☆ 4.0

Canon EOS M200

£499/$549/€560

A smart and small, multimedia compact.

- 24.1MP APS-C CMOS sensor
- DIGIC 8 image processor
- 3.0 inch 1.04m dot 180° tilt touchscreen
- UHD and HD movies
- 720p 120fps video recording
- Dual Pixel CMOS AF
- 143 AF points
- ISO range of 100-25600
- Bluetooth & Wi-Fi connectivity

Pros: Simple to operate. Uses the new DIGIC 8 processor. 4K video.
Cons: A modest upgrade on the M100. No viewfinder. A little basic.

★★½☆☆ 2.5

Canon EOS M5

£999/$1099/€1259 with 15-45mm kit lens

Compact and connected.

- 24.2 MP CMOS sensor
- Full HD 1080p movies at 60fps
- Wi-Fi and NFC connectivity
- In-camera 5-axis digital stabilisation
- 7fps continuous shooting in Raw
- Large electronic viewfinder
- Powerful DIGIC 7 processing
- 49 AF points
- Large, tilt touchscreen

Pros: Excellent electronic viewfinder. Great touchscreen. Good connectivity.
Cons: Expensive. No 4K UHD option. Build quality is lacking.

★★★★☆ 4.0

Canon EOS 2000D (US Rebel T7, Japan Kiss X90)

£325/$549/€399 (body only)

An easy and intuitive first DSLR.

- 24.2MP APS-C sensor
- Optical viewfinder With 9 point AF
- Image stabilisation
- 7.5cm 920,000 dot LCD monitor
- Built-in flash
- 3fps continuous shooting
- DIGIC 4+ image processor
- Full HD video capture
- ISO range 100-6400

Pros: High resolution sensor. User friendly. Built-in Wi-Fi
Cons: No vari-angle screen. No 4K video capture. Only 3fps continuous shooting.

★★★★☆ 4.0

EOS for enthusiasts

Develop new skills with a state-of-the-art DSLR

Now you can enjoy ultimate image quality from APS-C and full-frame high-performance sensors. Delve deeper into the fascinating world of photography, try out new ideas and tackle new projects. You have world leading imaging technology at your fingertips, so it's time to raise your game and shoot like you never thought possible before. The EOS system really helps you as you explore new compositions, locations and effects. Whether APS-C or moving up to full-frame, you can enjoy amazing levels of performance and image quality. You can shoot with ambient low light thanks to high ISO capability; or track and capture the action with faster and more accurate autofocus precision.

Thanks to HD video capture built in to your EOS camera, you can be just as creative with your movies as you are with your photos. If you can imagine it, you can capture it too. Your photos and movies will go to the next level and you will find yourself enjoying the process like never before. The camera's built in technology is there to assist whenever you need it. It even boasts transparent LCD overlays on the viewfinder to impart important information that gives you the guidance you need to improve your skills. A Canon DSLR is waiting for you, but which one? ■

> *"You have world leading imaging technology at your fingertips, so it's time to raise your game and shoot like you never thought possible before."*

Canon
EOS
90D
CANON ZOOM LENS EF-S 18-135mm 1:3.5-5.6 IS USM
φ67mm

Canon EOS 90D

TOP PICK

£1200/$1349/€1299 (body only)

Fast performance from a full-featured DSLR.

- 32.5MP APS-C CMOS sensor
- DIGIC 8 image processor
- 3.0 inch 1.04m dot vari-angle screen
- 4K UHD 30P video and HD 120P video
- 45-point all cross-type AF system
- Electronic shutter up to 1/16000th
- Bluetooth & Wi-Fi connectivity
- 5,481 selectable AF positions
- 10fps continuous shooting rate

Pros: Uncropped 4K video. 32.5MP sensor. Good ergonomics. Good battery life.
Cons: Elevated noise apparent at higher ISO levels. Not fully weatherproof.

Canon
EOS 90D
CANON ZOOM LENS EF-S 18-135mm 1:3.5-5.6 IS USM
φ67mm

★★★★★ 5.0

Canon
EOS 77D
CANON ZOOM LENS EF-S 18-135mm 1:3.5-5.6 IS USM
φ67mm

Canon EOS 77D

£829/$849/€854 (body only)

Powerful performance and control.

- 24.2 MP APS-C CMOS sensor
- Fastest Live View AF system
- Dual Pixel CMOS AF
- EOS integrated cleaning system
- 45 cross-type AF points
- ISO range from 100-25600
- 3.0 inch 1040K dot LCD
- 6fps continuous shooting
- Full HD 1080p movies at 60fps

Pros: Good 45 point AF system. Excellent Live view performance. Great image quality.
Cons: No 4K video mode. Only 95% viewfinder coverage. Low burst shooting rate.

★★★★½ 4.5

Canon EOS 6D Mark II

£1680/$1999/€1849 (body only)

The entry into the world of full-frame shooting.

- 26.2 MP full-frame CMOS sensor
- Max ISO 40000 expandable to 102400
- In-camera 5-axis digital stabilisation
- Full HD movies at 60fps
- Max burst rate of 6.5fps
- 3.0 inch vari-angle LCD touchscreen
- 4K time-lapse mode
- 45 AF points
- 4.2fps continuous shooting

Pros: Comfortable handling. Useful connectivity options. Refined touchscreen.
Cons: No 4K video mode. No USB 3.0. Viewfinder coverage slightly limited.

Canon
EOS 6D Mark II
CANON ZOOM LENS EF 24-105mm 1:4 L IS II USM
φ77mm

★★★★½ 4.5

EOS advanced

Used the world over from war zones to fashion shoots

When it comes to reliability, performance and the production of creative photography and video, the Canon professional range of camera bodies is the one-stop shop for results that you and your clients will love. Whatever the conditions, Canon's professional DSLR reliable performance will keep you shooting and keep delivering the shots you need. They are weather resistant, keeping dust and moisture at bay and their magnesium-alloy construction provide reliable strength and welcome lightness.

Look at any high-end sporting event or fashion shoot and you will see Canon professional cameras and lenses. Sports shooters love them for their advanced autofocus ability to lock on and track the action, coupled with amazing optics from the range of lenses available; it makes them a formidable image capture system. The full-frame benefits of these cameras is also beloved by portrait photographers who enjoy amazing image quality and prime lenses that offer large maximum apertures to deliver amazing shallow depth of field for creative selective focus effects.

If you demand the highest standards of performance and reliability, these cameras will deliver. It's no wonder they are used the world over and now their video capabilities can even be seen on mainstream TV shows. With the Canon range of advanced DSLRs, revolutionise the way you capture stills and video. ■

> *"If you demand the highest standards of performance and reliability, these cameras will deliver."*

Canon EOS 1D X Mark III

£6,999/$9,280/€8,300 (body only)

If you can afford it, this may be the best DSLR on the market.

- Weather-sealed magnesium alloy body
- Full-frame 36 x 24 mm CMOS sensor
- 20.1MP effective resolution
- DIGIC X image processor
- Dual Pixel CMOS AF
- 5.5K Raw video
- 4K video at 60fps
- 20fps continuous shooting
- Dimensions: 158 x 167.6 x 82.6 mm
- Weight: 1250g

SET
ON
LOCK
OFF

Pros: Endless features list. Amazing performance. Built like a tank.

Cons: Eye-watering price tag. Very heavy.

Canon
EOS-1D
X
Mark III
CANON LENS EF 50mm 1:1.2 L USM

★★★★⯪ 4.5

Canon EOS 5D Mark IV

£3349/$3299/€3249 (body only)

Explore the world of full-frame shooting.

- 30.4 MP full-frame CMOS sensor
- Dual Pixel Raw image system
- DIGIC 6+ image processing
- 4K UHD video capability at 30fps
- 150,000-pixel metering sensor
- 61 AF points
- 7fps continuous shooting
- ISO range 100-102400
- 3.2 inch 1620000 pixel screen

TOP PICK

WB
DRIVE·AF
ISO
50
2.8
640

Pros: Advanced AF. 7fps continuous shooting. Excellent image quality.

Cons: 4K video options limited. ISO range unchanged. Expensive compared to rivals.

Canon
EOS
5D
Mark IV
CANON ZOOM LENS EF
STABILIZER

★★★★★ 5.0

The EOS R full-frame mirrorless system

A new system that can integrate and complement your existing EOS equipment

Like the other major camera manufacturers, Canon has been leaning heavily into the development of its mirrorless models. Since the introduction of the first mirrorless EOS models, the EOS R in 2018, the R-system has grown significantly, and now includes 12 camera models, ranging from the entry-level EOS R100 to the amazing EOS R1 professional camera. While the R-system hasn't replaced the conventional reflex-mirror cameras in Canon's EOS range, it is now close to equalling the number of available models.

Mirrorless cameras offer many advantages over conventional SLRs, including lighter weight, superior performance, and more versatile video recording modes. Several cameras in the R series offer high-speed electronic shutters capable of 1/8,000th of a second, while others can shoot professional quality 6K video at 60fps. The power of Canon's back-illuminated CMOS sensor technology continues to improve, with some R-series models offering 45-megapixel resolution, while the new DIGIC Accelerator and DIGIC X processor ensure industry-leading performance.

The range of RF-mount lenses, specially designed for the R-system mirrorless cameras, has also grown a lot over the past few years, and now includes no less than 41 lenses, covering everything from 5.2mm dual-fisheye to a massive 1200mm super-telephoto. There are now so many that we don't have the space to cover all of them here, so we've just concentrated on the newest and most popular lenses, starting on page 40.

Whether you are a professional photographer, a filmmaker, or just an enthusiast, the Canon R-system offers choice of cameras and lenses that can comprehensively cover every need. ■

> *"Mirrorless cameras offer many advantages over conventional SLRs..."*

Canon
EOS
R8
CANON LENS RF24-50mm F4.5-6.3 IS STM
φ58mm

Canon EOS R1

£6,999/$9,280/€8,300 (body only)

Canon's new flagship is state-of-the-art mirrorless camera for professionals.

- Full-frame back-illuminated stacked CMOS sensor
- 24.2 megapixels effective resolution
- DIGIC Accelerator + DIGIC X image processor
- Dual Pixel Intelligent AF
- 30-1/8000 sec shutter speeds
- Real-time 6144-zone metering
- 40fps max shooting speed
- 0.64-inch OLED colour EVF (2048x1536)
- 8.0 cm (3.2") TFT colour LCD touchscreen monitor
- 6K RAW movie recording, 4K at 100fps
- Dimensions: 158 x 150 x 87 mm
- Weight: 1115g inc. battery & cards

Pros: Astonishing features list. Industry-leading video modes. Professional build quality.
Cons: Very, very expensive. Heavy to carry around.

Canon
EOS
R1

★★★★½ 4.5

Canon EOS R5 Mark II

£4,499/$5,938/€5,351 (body only)

The mirrorless version of the classic EOS 5D is packed with features.

- Full Frame back-illuminated stacked CMOS sensor
- 45 megapixel effective resolution
- DIGIC Accelerator and DIGIC X image processor
- Dual Pixel Intelligent AF
- 30-1/8000 sec shutter speeds
- Real-time 6144-zone metering
- 30 fps max shooting speed
- 0.5-inch OLED colour EVF (1600x1200)
- 8.0 cm (3.2") TFT colour LCD touchscreen monitor
- 8K RAW video up to 60p, 4K at 100fps
- Dimensions: 138.5 x 101.2 x 93.5 mm
- Weight: 746 g inc. cards & battery

Pros: A bit lighter and more portable than the R1. Pro-grade video features. Robust build quality.
Cons: Expensive.

Canon
CANON LENS RF24-105mm F4 L IS USM
EOS
R5

Canon
EOS
R5
Mark II

★★★★½ 4.5

Canon EOS R100

£459/$605/€546 (body only)

This entry-level model to the R system is great for beginners.

- 22.3 x 14.9mm CMOS sensor
- 24.1MP effective resolution
- DIGIC 8 image processor
- Dual Pixel CMOS AF System
- Face-tracking autofocus
- 384-zone evaluative metering
- 30 - 1/4000 sec shutter speeds
- 0.39-type OLED Electronic Viewfinder
- 7.5 cm (3.0") LCD (TFT) monitor
- 4K video at 25fps, HD at 120fps

Pros: Easy to use. Light and compact. Good entry point into Canon R system.
Cons: Polycarbonate body. Not weather-sealed.

★★★★½ 4.5

Canon EOS R50

£849/$1,119/€1,009 (body only)

This mid-range model packs a lot of features for everyday use.

- 22.3 x 14.9mm APS-C CMOS sensor
- 24.2MP effective resolution
- DIGIC X image processor
- Dual Pixel CMOS AF II
- 0.39 inch OLED colour EVF (1024x768)
- 7.5 cm (2.95") TFT vari-angle touchscreen
- 384-zone evaluative metering
- Built-in pop-up flash
- 4K video at 30fps, Full HD at 120fps
- Weight: 375g inc. card & battery

Pros: Light weight. Multi-angle monitor. Good AF system.
Cons: Expensive for what it offers.

★★★★☆ 4.0

Canon EOS R7

£1,449/$1,910/€1,772 (body only)

This compact mid-range APS-C camera is light and portable.

- 22.3 x 14.8mm APS-C CMOS sensor
- 32.5MP effective resolution
- DIGIC X image processor
- Dual Pixel CMOS AF II
- 384-zone evaluative metering
- 0.39 inch OLED colour EVF (1024x768)
- 7.5 cm (2.95") TFT vari-angle touchscreen
- 30fps continuous shooting
- 4K video at 30fps, Full HD at 120fps
- Magnesium alloy body
- Weight: 612g inc. card & battery

Pros: Compact size. High resolution despite APS-C sensor. Good video modes.
Cons: Limited features for the price.

★★★½☆ 3.5

Canon EOS R8

£1,699/$2,242/€2,021 (body only)

A lightweight camera that packs some heavyweight features.

TOP PICK

- Full-frame CMOS sensor
- 24.2 megapixels effective resolution
- DIGIC X image processor
- Dual Pixel CMOS AF II
- 384-zone evaluative metering
- 204,800 maximum ISO
- 4K video at 60fps, Full HD at 180fps
- 40fps max shooting speed
- Weather-sealed body

Pros: Light and compact. Tough weatherproof body. Great low-light performance. Good value for money.
Cons: None, really. This is a great camera

★★★★★ 5.0

Canon EOS R6 Mark II

£2,779/$3,664/€3,304 (body only)

This semi-pro model builds on the high reputation of its predecessor.

- Full-frame CMOS sensor
- 24.2MP effective resolution
- DIGIC X image processor
- Dual Pixel CMOS AF II
- 384-zone evaluative metering
- 30-1/8000 sec shutter speeds
- 0.5-inch OLED colour EVF, 3.69 Million dots
- 4K video at 60fps, Full HD at 180fps
- 7.5cm (3.0") Clear View touchscreen LCD II

Pros: Good video modes. Excellent EVF. Tough build quality
Cons: Expensive for what it offers. Not weather sealed.

★★★★½ 4.5

Canon EOS R10

£999/$1,318/€1,187 (body only)

One step up from the R100, this entry-level model offers great performance.

- 22.3 x 14.9mm APS-C CMOS sensor
- 24.2MP effective resolution
- DIGIC X image processor
- Dual Pixel CMOS AF II
- 384-zone evaluative metering
- 30-1/16,000 sec with electronic shutter
- 23fps continuous shooting
- 7.5 cm (2.95") TFT vari-angle touchscreen
- 4K video at 30fps, Full HD at 120fps

Pros: Good build quality. Multi-angle monitor. Good AF system.
Cons: The R50 offers virtually the same spec for less money.

★★★★☆ 4.0

Canon EOS R3

£5,499/$7,257/€6,538 (body only)

Aimed at professional sports and wildlife photographers, the R3 offers incredible performance.

- Full-frame back-illuminated stacked CMOS sensor
- 24.1MP effective resolution
- DIGIC X image processor
- Dual Pixel CMOS AF II
- Eye-control subject-tracking AF
- 0.5- inch OLED colour EVF, 5.76 Million dots
- 6K video at 60fps, 4K/Full HD at 240fps
- High-speed electronic shutter, up to 195fps

Pros: Amazing performance. Built like a tank.
Cons: Very expensive.
Specialised professional camera.

★★★★⯪ 4.5

Canon EOS R6

£1,667/$2,199/€1,982 (body only)

Explore your creative potential with this full-frame powerhouse.

- Full-frame CMOS sensor
- 20.1MP effective resolution
- DIGIC X image processor
- Dual Pixel CMOS AF II
- 384-zone evaluative metering
- 30-1/8000 sec shutter speeds
- 0.5-inch OLED colour EVF, 3.69 Million dots
- 4K video at 60fps, Full HD at 120fps
- 20fps continuous shooting
- 7.5cm (3.0") Clear View touchscreen LCD II
- Magnesium alloy body, 680g inc. card and battery

Pros: Good video modes. Excellent EVF.
Tough build quality.
Cons: Now superseded by the R6 Mk II.

★★★★☆ 4.0

Canon EOS RP

£1399/$1299/€1429 (body only)

A compact full-frame mirrorless.

- 26.2MP sensor
- Dual Pixel CMOS AF sensor
- Powerful DIGIC 8 image processor
- RF lens mount
- EF and EF-S lenses via mount adapter
- 4779 selectable AF points
- Wi-Fi and Bluetooth connectivity
- 0.5 inch 3.69M dot OLED EVF
- 7.5cm 1.04M dot vari-angle LCD
- 4K video 25fps
- ISO range 50-102400

Pros: Priced well to compete. Lightweight construction. 4K video.
Cons: Battery life below par. Dwarfed by the bigger RF lenses.

★★★★⯪ 4.5

Canon EOS R5

£3,649/$4,815/€4,339 (body only)

This high-end semi-pro camera can do it all

- Full Frame back-illuminated stacked CMOS sensor
- 45 megapixel effective resolution
- DIGIC X image processor
- Dual Pixel CMOS AF II
- 30-1/8000 sec shutter speeds
- Real-time 384-zone metering
- 20 fps max shooting speed
- 0.5-inch OLED colour EVF (1600x1200)
- 8.0 cm (3.2") TFT colour LCD touchscreen

Pros: Excellent feature set. Great video modes.
High effective resolution.
Cons: Now superseded by the R5 Mk II.

★★★★⯪ 4.5

Canon EOS Ra

£2,579/$3,402/€3,066 (body only)

This specialised astrophotography camera lets you see the sky in a whole new light.

- Full-frame CMOS sensor
- 30.3MP effective resolution
- DIGIC 8 image processor
- Dual Pixel CMOS AF
- 384-zone evaluative metering
- 102,400 ISO maximum sensitivity
- 30-1/8000 sec shutter speeds
- 0.5-inch OLED colour EVF, 3.69M dots (1280x960) / 8.01cm (3.15") Clear View LCD II
- Optimised Infrared Filter
- 30x magnification on monitor

Pros: Superb image quality for capturing the night sky.
Cons: Highly specialised for astrophotography.

★★★⯪☆ 3.5

Canon EOS R

£2350/$2230/€2585 (body only)

Canon's first full-frame mirrorless.

- 30.3MP sensor
- Dual Pixel CMOS AF sensor
- Powerful DIGIC 8 image processor
- RF lens mount
- 8fps continuous shooting
- 0.5 inch 3.69M dot OLED EVF
- 8cm 2.1M dot LCD monitor
- 4K video 30fps
- ISO range 50-102400
- -6 EV low light autofocus
- 132.5 x 98.3 x 84.4mm

Pros: Smaller and lighter than standard full-frame DSLRs.
Cons: Brand new system has limited lenses at the moment.

★★★★⯪ 4.5

Canon lenses

Team a great camera with a great lens for perfect images

Canon lenses are renowned for their optical abilities and the vast range available. Whether you are teaming an EOS M camera with a portable and lightweight EF-M lens or attaching a super-telephoto lens to one of their latest professional DSLRs, you can be sure there is something to suit everyone's needs.

Lenses have many different functions and abilities that allow you as a photographer to frame, compose and capture exactly what you need for the job in hand. If you want a cheap prime lens, with very shallow depth of field due to its large maximum aperture for some portrait work, then you have some great choices. If you need a more exotic tilt-shift lens for architectural photography, then there is a lens for you too. If sport and wildlife photography is more your game, then there are a number of fixed focal length and zoom lenses that can bring distant action right up close. The range is huge but over the following pages, we bring you our pick of various lenses for you to consider. ■

> *"Lenses have many different functions and abilities that allow you as a photographer to frame, compose and capture exactly what you need for the job in hand."*

EF-M lenses

Compact lightweight lenses designed exclusively for the EOS M-mount cameras

Canon
Canon
CANON ZOOM LENS EF-M 18-150mm 1:3.5-6.3 IS STM
EOS
ф55mm

EF-M 11-22mm f/4-5.6 IS STM

£319/$599/€435

Capture panoramic landscapes with this ultra-wide angle 11-22mm EF-M zoom lens.

Canon
11-22mm

- Ultra-wide 11-22mm EF-M zoom lens
- Compact, retractable lens design
- Smooth, quiet STM focusing in movies
- Dynamic IS for steady movies
- 3-stop optical Image Stabiliser
- High image quality
- 0.15m minimum focusing distance
- Manual focus ring

Pros: Very useful 3 stops of image stabilisation. Small and light. Low distortion.
Cons: Not very fast aperture, even wide open. A little pricey for what it is.

★★★★☆ 4.0

EF-M 15-45mm f3.5-6.3 IS STM

£229/$299/€317

A light, compact and versatile standard zoom lens ideal for everyday photography.

Canon
15-45mm

- Versatile zoom covering wide-angle to short telephoto perspectives
- Offers a 24-72mm equivalent focal length
- Optical design incorporates three aspherical elements controls distortion
- Optical Image Stabiliser incorporated into the lens design
- Capture sharp images even in low light

Pros: Good quality glass, and sharp across all apertures. Lightweight construction.
Cons: The lock button to deploy the zoom can be fiddly. Max aperture not the best.

★★★★☆ 4.0

EF-M 22mm f/2 STM

£154/$92/€209

A compact wide-angle pancake lens ideal for landscapes and everyday snapshots.

- 22mm wide-angle lens
- Easy to carry alongside your EOS M
- Superb low light results with f/2.0 aperture
- Smooth, quiet STM focusing in movies
- Great image quality from aspherical lens elements
- Shoot smooth out of focus backgrounds

Pros: Small, lightweight, and robust. Max aperture great for low light. Crisp images.
Cons: No auto/manual focus switch. Chromatic aberration reported. It hunts in video mode.

★★★★½ 4.5

EF-M 28mm f/3.5 Macro IS STM

£280/$299/€309

A unique macro lens to magnify and illuminate your world of photography.

Canon
MACRO 28mm

- World's first lens with a built-in Macro Lite
- Capable of focusing at infinity
- Hybrid IS for steady handheld photography
- One UD lens and two aspherical lenses
- Outstanding image clarity
- Equivalent to 45mm standard lens

Pros: Comes with a built-in macro light for close-up work. Good stabilisation and lightweight.
Cons: Focusing is not as fast and precise as you would like. Wider aperture would have been nice.

★★★★½ 4.5

EF-M 32mm f/1.4 STM

£499/$479/€560

For portraits, candids and compositions with a pleasing natural perspective.

- 51mm equivalent focal length
- f/1.4 maximum aperture
- f/16 minimum aperture
- Super Spectra Lens Coating
- 14 elements in 8 groups
- 7 diaphragm blades
- 46° diagonal angle of view
- Closest focusing distance 0.23m.

Pros: A good quality lens. A very fast and sharp EF-M mount lens, even at f/1.4.
Cons: Quite an expensive lens. Focusing not as fast as its USM cameras. No image stabilisation.

★★★★★ 5.0

EF-M 18-55mm f/3.5-5.6 IS STM

£219/$179/€298

The standard kit lens of the EOS M system. A versatile performer, great for stills and video.

Canon
18 24 28 35 45 55
18-55mm

- Versatile 18-55mm zoom lens ideal for everyday use
- Easy to carry alongside your EOS M
- Smooth, quiet STM focusing in movies
- Dynamic IS for smooth movies
- Sharp images with 4-stop Image Stabiliser
- Fast Auto Focus in stills, full time manual override

Pros: Great sharpness for a kit lens. Well constructed. Good everyday zoom lens.
Cons: Not particularly fast glass with f/3.5 variable aperture. Slow performer.

★★★★☆ 4.0

EF-M 18-150mm f/3.5-6.3 IS STM

£399/$499/€433

For landscapes or detail, this lens is ideal for your EOS M camera.

TOP PICK
Canon
18 24 35 50 70

- Versatile 18-150mm EF-M zoom lens
- 1x UD and 2x precision aspherical elements
- Focus down to 0.25m
- Dynamic IS for steady movies
- 4-stop optical Image Stabiliser
- High image quality
- Weighs just 300g
- Optional 55mm filters

Pros: Lightweight and compact design. Sharp images. Useful close-up mode. 4 stops of IS.
Cons: A little costly compared to others. Zoom action could do with more dampening.

★★★★★ 5.0

EF-M 55-200mm f/4.5-6.3 IS STM

£262/$339/€357

A compact telephoto zoom with image stabilisation that gets you closer to the action.

Canon
55 70 100 135
55-200mm

- Get closer to the action
- Image Stabiliser keeps images sharp
- Compact enough to go anywhere
- Smooth, near-silent STM focusing
- Make quick adjustments with a manual focus ring
- Shoot great quality images with sharp details and rich colour

Pros: A great performer for its size. Useful zoom range. Sharp and effective colour rendition.
Cons: It's not a fast lens with a lack of good bokeh. Plastic build. A bit expensive.

★★★★½ 4.5

EF-S lenses

Get creative with focal lengths from ultra-wide to telephoto with lenses for APS-C sized sensors

EF-S 10-18mm f/4.5-5.6 IS STM

£180/$249/€245

A light and compact wide-angle zoom.

- Get more in every shot with this ultra-wide zoom lens
- Easy to carry thanks to a compact design
- Smooth, near-silent AF when shooting movies
- 4-stop Image Stabiliser
- 0.22m close focusing

Pros: Smooth and quiet motor. Amazing 4 stops of image stabilisation. Exceptional image quality.
Cons: It uses a plastic mount, not metal. Can be a bit soft at the widest apertures.

★★★★★ 5.0

EF-S 10-22mm f/3.5-4.5 USM

£499/$649/€534

A small lightweight and ultra-wide-angle lens.

- Super wide angle zoom
- Superb image quality
- Lightweight and compact
- Focusing distance of just 24cm.
- Fast near-silent USM AF
- Super Spectra coatings
- Circular aperture

Pros: Excellent image quality and colour rendition. Lightweight and compact.
Cons: Filters will be visible at the wide end. Faster aperture would have been nice.

★★★★★ 5.0

EF-S 15-85mm f/3.5-5.6 IS USM

£529/$799/€721

A versatile image stabilised zoom lens.

- High performance all-purpose zoom
- 4 stop Image Stabiliser
- Automatic panning and tripod detection
- 0.35m close focusing
- UD and aspherical lenses
- 7-blade aperture
- Optional lens hood

Pros: The focus is fast and accurate. Images are sharp with good contrast. AF is quiet.
Cons: Some softness noted at edges. A little pricey. Disappointing bokeh. Quite heavy.

★★★★½ 4.5

EF-S 18-55mm f/3.5-5.6 IS II

£149/$199/€129

Affordable general purpose lens.

- Lightweight, compact design
- Wide-angle to short telephoto range
- Four stop Image Stabiliser
- Aspherical lens elements
- 0.25m close-focusing distance
- Circular aperture diaphragm
- High-speed AF

Pros: Excellent image quality, particularly around f/8. Low distortion. 4 stop stabilisation.
Cons: Can cause fringing in high contrast situations. Manual focus control a bit fiddly.

★★★★½ 4.5

EF-S 55-250mm f/4-5.6 IS STM

£157/$199/€213

A powerful zoom, with image stabilisation.

- Get close to distant subjects
- Smooth, quiet STM focusing
- Image Stabiliser reduces blur
- Lightweight, compact design you can take everywhere
- Easy-to-use design that delivers superb image quality

Pros: Great lens at a decent price. Spot on focusing is fast and quiet. Lightweight.
Cons: Focusing on distant objects may be difficult. Max aperture may not be suit all.

★★★★½ 4.5

EF-S 18-135mm f/3.5-5.6 IS STM

£295/$499/€401

Ultra-wide-angle lens with superb image quality.

- Versatile 18-135mm zoom range
- Smooth, quiet STM focusing
- Dynamic Image Stabiliser for smooth movie footage
- Fast autofocus with full-time manual override
- Minimum focusing distance of 0.39m

Pros: The focus is fast and accurate. Images are sharp with good contrast. AF is quiet.
Cons: Some softness noted at edges. A little pricey. Disappointing bokeh. Quite heavy.

★★★★½ 4.5

EF-S 17-55mm f/2.8 IS USM

£699/$829/€769

A low light lens with constant f/2.8 aperture.

- Wide angle zoom for EF-S mount bodies
- f/2.8 aperture throughout zoom range
- 3-stop Image Stabiliser
- Fast, quiet auto focus
- Super Spectra coating
- Circular aperture for pleasing background blur
- Passes distance information to E-TTL II
- Optional lens hood
- Focus right down to 35 cm

Pros: Focussing is fast, accurate and very quiet. Constant f/2.8 aperture. Very sharp.
Cons: Quality control issues raised. Can suffer lens creep when shooting downwards.

★★★★★ 4.5

EF-S 17-85mm f/4-5.6 IS USM

£219/$175/€229

An excellent all-purpose lens.

- Exceptional zoom range for all EF-S mount bodies
- Superb image quality
- Lightweight and compact
- Image Stabiliser with 3 stops compensation
- Fast near-silent USM AF
- Super Spectra coatings
- Circular aperture
- Optional exclusive lens hood

Pros: A fine walk around lens. Light and relatively compact. Useful zoom range.
Cons: Some reported mechanical problems. Low light focus problematic. Variable aperture.

★★★★★ 3.5

EF-S 35mm f/2.8 Macro IS STM

£369/$299/€379

A macro lens that brings its own light.

- 35mm APS-C lens
- 56mm equivalent focal length
- f/2.8 maximum aperture
- f/32 minimum aperture
- Hybrid image stabiliser
- 10 elements in 6 groups
- 7 diaphragm blades
- 42° diagonal angle of view
- Closest focusing distance 0.13m
- Easy-to-use lighting built-in

Pros: Built-in macro light for extreme close up work. Very low geometric distortion.
Cons: A number of reports speak of autofocus issues and a lack of sharp focus.

★★★★★ 3.5

EF-S 18-200mm f/3.5-5.6 IS

£389/$699/€530

A compact but powerful telephoto zoom.

- 11x zoom lens – 18-200mm
- 4 stop Image Stabiliser
- Automatic panning and tripod detection
- Close focusing distance of 0.45m
- Aspherical and UD lens elements
- Super-Spectra lens coatings combat ghosting and flare
- Zoom lock maintains minimum size
- Circular aperture for pleasing background blur

Pros: One lens fits all uses versatility. 11x zoom. 4 stops of image stabilisation.
Cons: Possible yellow colour cast issues reported. Quality and colour can suffer.

★★★★★ 4.0

EF-S 24mm f/2.8 STM

£139/$149/€159

A great lens for low light shooting and travel.

- Super-slim, pancake design
- Natural, human eye perspective
- Smooth, quiet focusing when shooting movies
- Close focus to 0.16m
- Uses a large/2.8 aperture to shoot in low light
- Lens construction 6 elements in 5 groups
- Optical zoom 0.27x

Pros: Vivid colours, great contrast and sharpness. Handles chromatic aberration well.
Cons: Noticeable barrel distortion. Vignetting can be rather strong at f2.8.

★★★★★ 4.0

EF-S 60mm f/2.8 Macro USM

£350/$399/€418

The first true macro lens in the EF-S range.

- 96mm focal length in 35mm format
- Compact and lightweight
- High corner-to-corner resolution, contrast and image quality
- Fast auto focus with nearly silent USM
- Full time manual focus override
- Super Spectra coating
- Macro facility lets you focus right down to 20cm
- Filter Size: 52 mm

Pros: Picture quality is excellent. Apertures from f/2.8 to f/32. Virtually no chromatic aberration.
Cons: Focus breathing can be an issue when changing focus. Blue cast reported.

★★★★★ 5.0

EF Prime lenses

Some key selections from the wide choice of Canon EF full-frame lenses

EF 14mm f/2.8L II USM

TOP PICK

£1889/$2099/€2571

A precision ultra-wide-angle lens.

- L-series construction with dust and moisture sealing
- Aspherical and UD lens elements
- Circular aperture
- Super Spectra coatings
- Rectilinear design
- Filter Size: Gelatine type

Pros: Very low distortion for such a wide lens. Image sharpness second to none.
Cons: The 16-35mm wide-angle zoom could be a cheaper option. It's a very expensive lens.

★★★★★ 5.0

EF 24mm f/1.4L II USM

£1224/$1549/€1666

A fast aperture wide-angle lens for low light.

- Wide 84° angle of view
- Fast f/1.4 aperture
- Aspherical and UD lens elements
- Subwavelength structure coating
- USM motor with full-time manual focus
- Weather and dust seals
- Robust build quality

Pros: Very good low light capability. Very sharp at f/4 and above. Fast focus. Sharp.
Cons: Autofocus can be way off on certain lenses. Pronounced distortion apparent.

★★★★½ 4.5

EF 28mm f/2.8 IS USM

£381/$499/€518

A compact and affordable wide-angle lens.

- 45mm equivalent on APS-C sized sensors
- Fast f/2.8 maximum aperture
- Up to four-stop Image Stabiliser
- Ultrasonic autofocus mechanism
- Circular aperture for soft background blur
- Super Spectra coatings reduce flare

Pros: Wide maximum aperture great for low light. Four stops image stabilisation. Very sharp.
Cons: Built to a price with lighter materials. Some distortion may be noticeable at the edges.

★★★★☆ 4.0

EF 35mm f/2 IS USM

£399/$549/€543

A versatile standard f/2 prime lens.

- Up to four stops of image stabilisation
- Fast f/2 maximum aperture
- Ultrasonic AF for quick focusing
- Compact, lightweight design
- Eight-bladed aperture for smooth bokeh
- Moulded glass elements for sharpness
- 0.24m minimum focus distance

Pros: Very good quality and sharpness for a non-L series lens. IS works very effectively.
Cons: Some diffraction may be noticeable at f/5.6. Expensive and heavy. AF can be loud.

★★★★☆ 4.0

EF 35mm F1.4 II USM

£1550/$1799/€2150

An ultra-fast standard prime lens.

- A wide f/1.4 maximum aperture
- A wide-angle view with a natural perspective
- Superb low-light performance and depth of field control
- Fast and virtually silent USM autofocus
- Keep shooting even in tough conditions with L-series build-quality

Pros: Fast autofocus. Very sharp images. Very wide maximum aperture for low light work.
Cons: Certain lenses reported with loose focus rings. Large and heavy. Very expensive.

★★★★½ 4.5

EF 40mm f/2.8 STM

£350/$399/€418

This versatile lens is a great travel companion.

- Portable pancake design
- Smooth, quiet STM focusing
- Fast f/2.8 maximum aperture for low-light shooting
- Close focus to 0.3m
- Fast, quiet AF for pin-sharp results
- Great image quality right across the frame

Pros: Very small and lightweight. Tack sharp images. Low chromatic aberration.
Cons: Reports of difficulty mounting the lens or focusing stopping. Focusing can be slow.

★★★★½ 4.5

EF 50mm f/1.2L USM

£1000/$1499/€1361

A fast standard prime lens, offering great performance for everyday photography.

- Large f/1.2 aperture
- USM autofocus
- Super Spectra coatings
- Circular aperture for excellent background bokeh
- Provides distance information for the E-TTL II flash system
- Soft case and lens hood
- Filter size: 72 mm

Pros: Razor sharp images at f1.2 and up. Top-notch L series build quality and optics.
Cons: It can sometimes focus erratically and suffer from chromatic aberration.

★★★★½ 4.5

EF 85mm f/1.2L II USM

£1452/$1999/€1976

A professional ultra-fast short telephoto, perfect for low light and creative portraits.

- Extreme f/1.2 maximum aperture
- Fast, quiet autofocus
- Super Spectra coatings
- Circular aperture for smooth background bokeh
- Integration with E-TTL II flash system
- Soft case and lens hood
- Closest focusing distance 0.95m
- Filter diameter 72mm

Pros: Beautiful bokeh wide open. Very sharp, with amazing contrast. Perfect portrait lens.
Cons: Expensive. Can be slow to autofocus. Chromatic aberration can be very pronounced.

★★★★½ 4.5

EF 100mm f/2.8L Macro IS USM

£635/$899/€864

An image stabilised macro telephoto lens ideal for precision close-up photography.

- Canon L-series high performance macro
- 4 stop Hybrid IS
- Life size image reproduction (1:1)
- UD lens element
- Water and dust resistant
- Three position distance limiter
- 9 blade circular aperture for beautiful bokeh
- Ring type USM AF motor
- Optional tripod collar

Pros: A sharp, solid, versatile macro lens. Fast max aperture and well balanced.
Cons: Quality control issues raised. AF reported as slow or even fails to lock.

★★★★½ 4.5

EF 300mm f/2.8L IS II USM

£4799/$6099/€6531

A high performance telephoto lens ideal for all types of sports or action photography.

- 300mm f/2.8 high-performance super-telephoto lens
- Part of Canon's acclaimed L series
- Durable, rugged and lightweight
- 4 stop Image Stabiliser
- Enhanced image quality
- 3 IS modes
- Quiet and fast autofocus
- 16 elements in 12 groups

Pros: Incredible tack sharp images. Perfectly suited to demanding environments.
Cons: As good as it is, you cannot overlook the enormous price tag. For the pros.

★★★★★ 5.0

EF 400mm f/2.8L IS II USM

£7698/$9999/€10477

Ultra-high performance, fast telephoto with image stabilisation and USM focusing.

- 400mm f/2.8 ultra-high-performance super-telephoto lens
- Part of Canon's acclaimed L series
- 4 stop Image Stabiliser
- 3 IS modes
- Durable, rugged design
- Enhanced image quality
- Quiet and fast autofocus
- 16 elements in 12 groups

Pros: Incredible performance and image quality. Sharp even at f/2.8. Highest quality optics.
Cons: Staggering price tag. Reports that it is slow to focus with x2 extenders.

★★★★½ 4.5

EF 600mm f/4L IS II USM

£8895/$11499/€12107

The ultimate high-speed super telephoto lens, used by pro sports photographers.

TOP PICK

- Fluorite and UD elements
- Fast f/4 max aperture
- Ring-type USM for fast AF
- 4-stop Image Stabiliser
- Protective fluorine coating
- 4.5m min focus
- 9 blade aperture
- Power focus for video
- Dust and moisture resistant

Pros: Focus is fast and sharp, even with a teleconverter. Lighter than the previous version.
Cons: Stories of the lens handle breaking under the weight of the lens. Very expensive.

★★★★★ 5.0

EF Zoom lenses

Enjoy the flexibility to change your framing to match your vision

EF 11-24mm f/4L USM

£2699/$2799/€2549

The best in ultra-wide-angle photography.

- Minimum focusing distance of 11 in./0.28m
- 9 diaphragm blades
- 16 element in 11 groups
- The widest angle rectilinear zoom lens
- Minimal distortion for architecture
- Advanced lens coatings
- Swift, nearly silent AF

Pros: Astonishing scope and quality. Superb sharpness, colour rendition, and contrast.
Cons: Colour fringing reported at 11mm. Sigma's 12-24 might be an alternative. Heavy.

★★★★☆ 4.0

EF 8-15mm f/4L Fisheye USM

£912/$1249/€1241

A versatile fisheye zoom lens.

- Circular or full-frame Fisheye zoom lens
- Part of Canon's acclaimed L series
- Durable and rugged design
- Quiet and fast autofocus
- Full-time manual focusing
- Easier lens cleaning
- 14 elements in 11 groups

Pros: Circular and diagonal fisheye options. Excellent L series build quality.
Cons: Very expensive for a fisheye lens. Lens cap fit is suspect. Ghosting around 15mm.

★★★★½ 4.5

EF 16-35mm f/2.8L III USM

£1899/$1999/€2242

With new optics and amazing sharpness.

- Fast constant f/2.8 aperture
- 16 elements in 11 groups
- 9 diaphragm blades
- Minimum aperture f/22
- Minimum focusing distance 0.28m
- Robust, weather sealed construction
- Advanced ring type USM motor

Pros: Sharper corner to corner than the lens it replaced. Light but sturdy. Versatile.
Cons: Heavy vignetting apparent when wide open. Not a jack-of-all-trades landscape lens.

★★★★½ 4.5

EF 17-40mm f/4L USM

£549/$799/€747

A lightweight and affordable ultra-wide zoom.

- Superb optical performance throughout the zoom range
- Fast autofocus speed
- Highly resistant to dust and moisture
- 28cm minimum focusing distance at all focal lengths
- 12 elements in 9 groups

Pros: Quality L series lens. Incredible image quality and fast focusing. Relatively inexpensive.
Cons: Distortion reported at 17-20mm focal lengths. Copies seem to suffer softness issues.

★★★★½ 4.5

EF 24-70mm f/2.8L II USM

£1499/$1749/€1699

It's the perfect lens for any full-frame camera.

- Nine blade circular aperture
- Manual focus override
- Fast, quiet autofocus
- Sealed against dust and moisture
- 0.38m close focus
- Fast f/2.8 max. aperture
- All new optical design

Pros: Superb, almost perfect optics. Fast, silent, and accurate autofocus. Quality build.
Cons: Vignetting around 50-70mm at f/2.8. No image stabilisation. Expensive.

★★★★☆ 4.0

EF 24-70mm f/4L IS USM

£689/$999/€937

With fixed f/4 aperture and close macro focus.

- Versatile zoom range
- Macro mode for up to 0.7x magnification
- Up to four-stop Image Stabiliser
- Two aspherical and two UD lens elements
- Fast ultrasonic AF
- Sealed against dust and moisture
- Nine-bladed aperture for soft bokeh

Pros: Very sharp, compact, and light. Macro mode can be very useful. Impressive four stop IS.
Cons: Heavy vignetting apparent. Back-focusing issues for some. May need calibration.

★★★★☆ 4.0

EF 24-105mm f/4L IS II USM

£1029/$1099/€1208

One of the great all-rounders. Perfect for landscapes, portraits, sports and more.

- Superb L-series optical performance
- 17 elements in 12 groups
- 4 glass-moulded (GMo) aspherical lenses
- 10-blade circular aperture
- Improved IS system for better handheld performance
- Up to 4 stops of shake reduction
- Improved edge-to-edge results with reduced distortions

Pros: Very versatile lens. Controls vignetting very well. Effective four stop IS.
Cons: May not be worth the upgrade if you have the original. Could have been sharper.

★★★★☆ 4.0

EF 70-200mm f/2.8L IS II USM

£1524/$2099/€2074

A rugged and dependable fast telephoto zoom, with 4-stop image stabilisation.

- High-performance, L-series telephoto zoom lens
- Constant maximum aperture of f/2.8
- Four-stop Image Stabiliser
- Fluorite and UD lens elements
- Improved durability
- 1.2m minimum focussing
- Water and dust resistant
- Ring type USM AF motor

Pros: Very sharp wide open, and even sharper at f/4. Good colour rendition and great contrast.
Cons: Not as sharp at the close focus distance. Now superseded by the IS III USM.

★★★★★ 5.0

EF 70-300mm f/4-5.6 IS II USM

£449/$499/€549

Another great all-rounder perfect for portraits, landscapes, sports and more.

- Get closer to distant subjects
- Compatible with all EOS cameras
- A portable design you can take anywhere
- Weighs just 710g
- Unique Lens Information Display
- Nano USM AF also delivers smooth focus
- 4 stop Image Stabiliser
- Superior image quality and sharpness
- 9 bladed lens diaphragm

Pros: Fast autofocus. Improved image stabilisation. Portable, with good image quality.
Cons: Not fully weather sealed. Lens hood an option. Degraded image quality in highlights.

★★★★☆ 4.0

EF 70-300mm f/4-5.6L IS USM

£899/$1349/€1223

A robust and compact image-stabilised telephoto zoom offering superb image quality.

- High performance telephoto zoom lens
- Part of Canon's acclaimed L series
- 4 stop Image Stabiliser
- Two UD elements
- Highly resistant to dust and water
- 8 blade circular aperture
- Quiet & fast autofocus
- Compatible with a tripod collar

Pros: Sharp as they come, with good contrast. Quick and accurate AF. Nice bokeh.
Cons: Focus is a bit slow. Quite heavy and bulky. Variable aperture. Expensive.

★★★★⯪ 4.5

EF 70-200mm f/2.8L IS III USM

£2000/$2100/€2499

One of the most versatile lenses available with advanced optics.

- Constant maximum aperture of f/2.8
- 3.5-stop image stabilisation
- 23 elements in 19 groups
- Maximum aperture f/2.8
- Minimum aperture f/32
- 8 rounded diaphragm blades.
- 77mm filter size
- Air Sphere coating
- Water and dust resistant

Pros: Bright constant f/2.8 maximum aperture. Improved image stabilisation. Sharp and fast.
Cons: Very heavy for its size. Reports of softness in low light. The IS II remains good value.

★★★★⯪ 4.5

EF 100-400mm f/4.5-5.6L IS II USM

£1778/$2049/€1906

You can't go wrong with this high performance super-telephoto zoom.

- Versatile, portable super-telephoto zoom lens
- Superb image quality right across the frame
- 4 stop Image Stabiliser
- Customise the zoom control
- Fast, near silent focusing
- Shoot confidently in tough weather conditions
- Focuses down to 0.98m

Pros: Good sharpness and excellent build quality. Low chromatic aberration, low distortion.
Cons: More expensive than the old 100-400mm. IS can lag a little. Very heavy.

★★★★⯪ 4.5

Tilt-shift lenses and extenders

Control your perspective or extend your reach with special lenses and adapters

CANON LENS TS-E 135mm 1:4 L MACRO
Canon
TS-E 135mm

TS-E 17mm f/4L

£1799/$2149/€2699

A specialist wide angle tilt-shift lens for distortion free architectural photography.

CANON LENS TS-E 17mm 1:4 L
Canon
TS-E 17mm

- Ultra-wide 17mm tilt and shift lens
- Low distortion and high resolution
- 6.5° tilt and 12mm shift
- Independent tilt or shift rotation
- Aspherical and UD lens elements
- Subwavelength Structure and Super Spectra coatings
- Circular aperture
- 18 elements in 12 groups

Pros: A unique use lens. Great sharpness and overall image quality. Low distortion.
Cons: Filters cannot be used on it. Very expensive. No protection for the front element.

★★★½☆ 3.5

TS-E 24mm f/3.5L II

£1579/$1899/€1782

A wide range of movement for expanded possibilities of tilt-shift photography.

CANON LENS TS-E 24mm 1:3.5 L
Canon
TS-E 24mm

- Low distortion and high resolution
- 8.5° tilt and 12mm shift
- Independent tilt and shift movements
- Aspherical and UD lens elements
- Subwavelength Structure and Super Spectra coatings
- Circular aperture
- High precision, large diameter moulded glass aspherical lens element

Pros: Almost no visible distortion. Excellent central sharpness. Flexible perspective control.
Cons: Learning curve to using tilt-shift lenses to best effect. Heavy and expensive.

★★★★☆ 4.0

TS-E 45mm f/2.8

£1199/$1399/€1470

An angle of view similar to a standard 50mm lens for natural looking perspectives.

- 45mm tilt and shift lens
- Natural perspective with image control
- 8° tilt and 11mm shift
- Rear focusing system
- Non-rotating front element
- Sharp images from 0.4m to infinity
- Super Spectra coatings ensure accurate colour balance
- 10 elements in 9 groups

Pros: A sharp lens with a very solid build quality. Focus rotation smooth. Great optics.
Cons: Expensive. Issues with focussing at infinity. Manual focus only. Requires manual exposure.

★★★★☆ 4.0

TS-E 50mm f/2.8L Macro

£2199/$2261/€2469

A specialist L-series prime lens with perspective control.

- Macro ratio 1:2 life size
- 50mm full-frame lens
- f/2.8 maximum aperture
- f/32 minimum aperture
- 12 elements in 9 groups
- 9 diaphragm blades
- 46° diagonal angle of view
- ffl 8.5° Tilt and ffl12mm Shift
- Closest focusing distance 0.273m

TOP PICK

Pros: Excellent sharpness. Very low distortion. Low chromatic aberration. No flare.
Cons: A very expensive lens with possible limited use. Bulky and heavy. No full rotation.

★★★★½ 4.5

TS-E 90mm f/2.8L Macro

£2199/$2199/€2469

Perspective control for beautiful portraits and product images.

- Macro ratio 1:2 life size
- 90mm full-frame lens
- f/2.8 maximum aperture
- f/45 minimum aperture
- Distance information
- 11 elements in 9 groups
- 9 diaphragm blades
- 27° diagonal angle of view
- Closest focusing distance 0.39m

Pros: Excellent sharpness. Very low distortion. Low chromatic aberration. Quality build.
Cons: An expensive lens with a learning curve to reveal its best potential. Bulky and heavy.

★★★★☆ 4.0

TS-E 90mm f/2.8

£1344/$1399/€1472

Suitable for a variety of subjects, from product photography to architecture.

- 90mm tilt and shift lens
- Telephoto lens with image control
- 8° tilt and 11mm shift
- 58mm filter size
- Non-rotating front element
- Featuring six elements in five groups
- Super Spectra coatings reduce flare and ghosting
- 11 elements in 9 groups

Pros: Very sharp lens for a non-L series product. Can use a filter. Almost zero chromatic aberration.
Cons: Locking knobs are small and fiddly. More degrees of tilt and shift would have been nice.

★★★★½ 4.5

Extender EF 1.4x III

£359/$429/€478

Ideal for sports and nature photography. Increase the focal length of lenses by 1.4x.

- Extends the master lens focal length by 1.4x
- Outstanding image quality
- Highly resistant to dust and water
- Improved communication between lens and camera
- Optimised lens coatings
- Compatible with L-Series telephoto and telephoto zoom lenses

Pros: Lovely image quality. Lightweight and portable. Superb build quality. IS lenses still work.
Cons: Expensive compared to others. Limited to certain lenses. Can reduce image contrast.

★★★½☆ 3.5

Extender EF 2x III

£389/$499/€489

Like the extender 1.4x version but this can increase the focal length by a factor of 2x.

- Extends the master lens focal length by 2x
- Outstanding image quality
- Highly resistant to dust and water
- Improved communication between lens and camera
- Optimised lens coatings
- Compatible with L-Series telephoto and telephoto zoom lenses

Pros: Highly resistant to dust and water. Extends the focal length by 2x. Improved AF performance.
Cons: It is not compatible with ALL EF lenses. Expensive compared to third party options.

★★★½☆ 3.5

EOS RF lenses

Begin your journey into the world of Canon full-frame mirrorless photography

RF 100-300mm F2.8L IS USM

£11499/$15116/€13658

A super-fast telephoto zoom lens that gives you the advantage for sports and wildlife.

- Maximum aperture f2.8
- Minimum aperture f22
- 5.5 stops image stabilisation
- 23 elements in 18 groups
- Closest focusing distance 1.8m
- Weight: 2,590g

Pros: Superb ultra-fast sports and wildlife lens. Great image stabilisation. Fast USM focusing.
Cons: Very expensive. Only for specialists.

★★★★½ 4.5

RF 1200mm F8L IS USM

£22449/$29509/€ 26661

If you want to have the best wildlife photography lens on the market, here it is, if you can afford it!

- Maximum aperture f8
- Minimum aperture f64
- 4 stops image stabilisation
- 26 elements in 18 groups
- Closest focusing distance 4.3m
- Weight: 3,340g

Pros: Amazing clarity at extreme range. 4 stops of optical IS. Light for its size and spec.
Cons: Breathtakingly expensive. Over 53cm long.

★★★★½ 4.5

RF 24-105mm F2.8L IS USM Z

£3349/$4402/€3977

A professional 24-105mm fast zoom lens for filmmaking and stills.

TOP PICK

- Maximum aperture f2.8
- Minimum aperture f22
- 5.5 stops image stabilisation
- 23 elements in 18 groups
- Closest focusing distance 0.45m
- Weight: 1,430g

Pros: Versatile zoom range. Great for video or stills. Excellent optical IS. Fast USM focusing.
Cons: A little bit bulky, perhaps.

★★★★★ 5.0

RF 28mm F2.8 STM

£344/$452/€408

A super compact wide-angle prime lens that's perfect for street photography.

- Maximum aperture of f/2.8
- Minimum aperture f22
- 7 diaphragm blades
- 8 elements in 6 groups
- Closest focusing distance 0.23m
- Weight: 120g

Pros: Ultra-compact. Fast autofocus. Unobtrusive.
Cons: No image stabilisation.
A bit niche for most users.

★★★★☆ 4.0

RF 35mm F1.4L VCM

£1819/$2390/€2160

An ultra-fast wide-angle hybrid lens designed for stills and video.

- Maximum aperture f1.4
- Minimum aperture f16
- 7 stops image stabilisation
- 11 elements in 14 groups
- Closest focusing distance 0.28m
- Weight: 555g

Pros: Nano USM focusing. Great for stills and video. Huge maximum aperture.
Cons: A bit specialised. Lacks the versatility of a zoom.

★★★★☆ 4.0

RF-S 3.9mm F3.5 STM DUAL FISHEYE

£1249/$1641/€1483

Step into virtual reality content creation with this innovative dual lens.

- Maximum aperture f3.5
- Minimum aperture f16
- Angle of view 144 degrees
- 11 elements in 8 groups
- Closest focusing distance 0.2m
- Weight: 290g

Pros: One of the few lenses of its kind in the world. Innovative design.
Cons: Very specialised. Not suitable for general photography.

★★★★½ 4.5

RF 600mm F4L IS USM

£14179/$18629/€16837

A high performance super telephoto lens with class-leading portability and performance.

- Maximum aperture f4
- Minimum aperture f32
- 5.5 stops image stabilisation
- 17 elements in 13 groups
- Closest focusing distance 4.2m
- Weight: 3,090g
- Maximum magnification: 0.15
- Max diameter: 168mm
- Length: 472mm

Pros: One of the best wildlife lenses in the world. Light for its size. Great performance.
Cons: Very expensive.

★★★★★ 5.0

RF 70-200mm F4L IS USM

£1769/$2324/€2100

The perfect versatile, weatherproof telephoto zoom for your travel kit.

- Maximum aperture f4
- Minimum aperture f32
- 5 stops image stabilisation
- 16 elements in 11 groups
- Closest focusing distance 0.6m
- Weight: 695g
- Maximum magnification: 0.28
- Max diameter: 83.5mm
- Length: 119mm

Pros: Versatile. Compact. Light weight. Great image quality. Fast focusing. Weather resistant.
Cons: None. This is a great lens.

★★★★⯪ 4.5

RF 24mm F1.8 MACRO IS STM

£669/$878/€794

This small, light 24mm prime lens combines wide-angle with a fast aperture.

- Maximum aperture f1.8
- Minimum aperture f22
- 5 stops image stabilisation
- 11 elements in 9 groups
- Closest focusing distance 0.14m
- Weight: 270g
- Maximum magnification: 0.5
- Max diameter: 74.4mm
- Length: 63.1mm

Pros: Fast wide-angle macro. Quiet autofocus. Excellent image stabilisation.
Cons: Rather expensive. Very specialised.

★★★★☆ 4.0

RF 16mm F2.8 STM

£319/$419/€378

An affordable ultra-wide prime lens ideal for architecture, landscapes or v-logging.

- Maximum aperture f2.8
- Minimum aperture f22
- 7 diaphragm blades
- 9 elements in 7 groups
- Closest focusing distance 0.13m
- Weight: 165g
- Maximum magnification: 0.26
- Max diameter: 69.2mm
- Length: 40.2mm

Pros: Lightweight high-quality ultra-wide prime. Low cost. Great for landscapes and more.
Cons: No image stabilisation.

★★★★☆ 4.0

RF 10-20mm F4L IS STM

£2759/$3625/€3276

The widest-angle AF zoom lens in the world, for breathtaking architecture and landscape shots.

- Maximum aperture f4
- Minimum aperture f22
- 5 stops image stabilisation
- 16 elements in 12 groups
- Closest focusing distance 0.25m
- Weight: 570g
- Maximum magnification: 0.06-0.12
- Max diameter: 83.7mm
- Length: 112mm

Pros: Amazing photos from a world-beating lens. Great for landscapes and architecture.
Cons: A bit specialised for most people. Expensive.

★★★★⯪ 4.5

RF 85mm F1.2L USM DS

£3499/$4597/€4155

Shoot beautiful portraits with the wide-aperture prime lens.

- Maximum aperture f1.2
- Minimum aperture f16
- 9 diaphragm blades
- 13 elements in 9 groups
- Closest focusing distance 0.85m
- Weight: 1,200g
- Maximum magnification: 0.12
- Max diameter: 103.2mm
- Length: 117.3mm

Pros: Ultra-sharp. Low distortion. Beautiful bokeh. Fast, silent focusing. Perfect portrait lens.
Cons: Expensive. Heavy weight.

★★★★⯪ 4.5

RF 35mm f/1.8 IS Macro STM

£520/$499/€584

A versatile high-quality 35mm lens for the EOS R mirrorless system.

- Maximum aperture of f/1.8
- 5 stops image stabilisation
- 11 elements in 9 groups
- 9 diaphragm blades
- Closest focusing distance 0.17m
- 63° diagonal angle of view

Pros: Fast AF system. Amazing build quality. Great sharpness with sharp corners wide open.
Cons: Not a true 1:1 macro lens. Some vignetting visible. Noisy AF motor. Some distortion visible.

4.5

RF 50mm f/1.2L USM

£2350/$1550/€2641

Amazing optical clarity and performance for your full-frame photography.

TOP PICK

- Maximum aperture of f/1.2
- 15 elements in 9 groups
- 10 diaphragm blades
- Closest focusing distance 0.4m
- 46° diagonal angle of view
- Distance information

Pros: Superb sharpness, even at widest aperture. Very fast AF. Very low chromatic aberration.
Cons: A large and heavy lens. Very expensive. Some vignetting apparent at widest apertures.

5.0

RF 24-105mm f/4L USM

£1120/$1800/€1258

A flexible lens for portraits, landscapes and creative film making.

- Maximum aperture of f/4
- 18 elements in 14 groups
- 9 diaphragm blades
- Closest focusing distance 0.45m
- 84° - 23° diagonal angle of view
- 5 stop image stabilisation

Pros: Five stops of image stabilisation. Customisable control ring. Impressive sharpness.
Cons: Expensive for an f/4 zoom. Some fringing is apparent. Some barrel and pincushion distortion.

4.5

RF 85mm f/1.2L USM

£2687/$2699/€2999

An L series prime lens with incredible low light performance.

- Maximum aperture of f/1.2
- Smooth, fast, USM motor
- 13 elements in 9 groups
- 9 diaphragm blades
- Closest focusing distance 0.85m
- 28° diagonal angle of view

Pros: Fast autofocus. Highest build quality and performance. Impressive sharpness across the range.
Cons: Not image stabilised. Very big and heavy on the EOS R. Very expensive lens.

4.5

RF 28-70mm f/2L USM

£3050/$4800/€3428

An amazing quality f/2 advanced L-series wide-angle zoom lens.

- Maximum aperture of f/2
- Minimum aperture of f/22
- 19 elements in 13 groups
- Closest focusing distance 0.39m
- 75° - 34° diagonal angle of view
- Distance information

Pros: Superb image quality. Extremely versatile all-rounder. Fast aperture. Weather sealed.
Cons: Not image stabilised. Needs a tripod collar. Very big, bulky, and expensive lens.

4.5

RF 24-240mm f/4-6.3 IS USM

£899/$899/€989

A very versatile 10x zoom for EOS full-frame cameras.

- Nano USM AF system
- Maximum aperture f/4 to f/6.3
- Closest focusing distance 50cm
- Image stabilisation
- 21 elements in 15 groups
- 7 diaphragm blades

Pros: Versatile zoom range for travel photography. Weighs only 750g.
Cons: Variable aperture slow around 100mm. Noticeable chromatic aberration.

4.5

RF 15-35mm f/2.8L IS USM

£2329/$2299/€2629

A useful, large, constant aperture, wide-angle zoom lens.

TOP PICK
Canon
15-35

- Wide-angle zoom lens
- Maximum aperture f/2.8
- Minimum aperture f/22
- 110° to 63° angle of view
- Maximum magnification 0.21x
- Closest focusing distance 28cm
- 16 elements in 12 groups
- 9 diaphragm blades
- Weight 840g

Pros: 5 stops of image stabilisation. Very low distortion. Fast focusing.
Cons: Hugely expensive. Large, bulky lens. Edge sharpness is below par.

★★★★★ 5.0

Mount Adapter EF-EOS R

£99/$99/€129

The standard Mount Adapter EF-EOS R allows EF-S and EF lenses to be used on EOS R cameras.

Canon
MOUNT ADAPTER EF-EOS R

Pros: Works flawlessly for connecting existing EF and EF-S glass. Retains full AF.
Cons: The most basic adapter Canon offers for the EOS R. Lacking in features.

★★★★☆ 4.0

RF 24-70mm f/2.8L IS USM

£2399/$2299/€2700

A high image quality and bright maximum aperture zoom lens.

- Wide-angle to portrait length zoom
- Maximum aperture f/2.8
- Minimum aperture f/22
- 84° to 34° angle of view
- Maximum magnification 0.3x
- Closest focusing distance 21cm
- 21 elements in 15 groups
- 9 diaphragm blades
- Weight 900g

Pros: 5 stops of image stabilisation. Quiet focusing. Very sharp around f/8.
Cons: A big price tag. Edge sharpness is reported as average.

★★★★½ 4.5

Control Ring Mount Adapter EF-EOS R

£179/$199/€199

Control Ring Mount Adapter EF-EOS R offers the same lens mount conversion as Mount Adapter EF-EOS R but also adds a Lens Control Ring.

Pros: Sturdy build quality. Adds programmable control ring function. Good weather sealing.
Cons: Suddenly double the price for one added feature. Control ring fiddly in use.

★★★½☆ 3.5

Drop-in Filter Mount Adapter EF-EOS R

£220/$239/€240

Drop-in Filter Mount Adapter EF-EOS R takes the functionality of Mount Adapter EF-EOS R and adds the ability to use drop-in filters.

Canon
DROP-IN FILTER MOUNT ADAPTER EF-EOS R

Clear Drop-in Filter

A clear filter, for users who have bought the drop-in filter adapter but who do not wish to have any filter effects.

Circular Polariser

A circular polarising filter which boosts colour, contrast and saturation, and controls unwanted reflections.

Variable ND

A neutral density filter controlling exposure in movies and prolonging shutter speeds for a variety of creative movement effects.

Pros: A useful addition when teamed with L series lenses on the EOS R body. Saves on a lot of filters.
Cons: Filter adjustment wheel very sensitive. Does not support RF lenses, only EF lenses.

★★★★☆ 4.0

Canon Speedlites

Flashes that will light up your creativity

Bring the light and take a step further in the world of creative photography; as you develop your skills as a photographer, you will discover the benefits of being in control of your own lighting to really express your creative vision. Using your own lighting equipment is how you elevate your work above those who shoot with ambient light. Using your own lighting schemes allows you to produce a distinctive look that cannot be achieved any other way. Whenever you are using a flash to simply fill in dark shadows on a bright day or using a multiple light setup to bring life to a dark setting, the Canon Speedlite range of flashes will give you all the creative control you need.

Use them mounted to the hot-shoe of your camera or use a wireless triggering system with a number of off camera flashes to get even more impact and visual drama. From small, simple but effective flashguns for EOS M cameras, to the top of the range models that are powerful and packed with impressive features, there is going to be something that suits your needs. If you require versatility and creative control of your photography, it can be dome in a flash! ■

> *"Using your own lighting equipment is how you elevate your work above those who shoot with ambient light."*

Canon Speedlite EL-1

£1,199/$1572/€1,423

This range-leading flashgun offers reliability and performance that professionals can depend on.

- Guide number: 60 (ISO100)
- Recycle time: 0.1-0.9 sec
- Up to 170 full-power flashes in a burst
- 24-200mm focal length coverage
- E-TTLII/E-TTL exposure control
- 15m wireless range
- Fully articulated head

Pros: Powerful weatherproof professional flash with tons of features.
Cons: Heavy and bulky. Very expensive. Aimed at professionals.

★★★★½ 4.5

Canon Speedlite EL-5

£499/$654/€592

A powerful, advanced flash with outstanding performance for all situations.

- Guide number: 60 (ISO100)
- Recycle time: 0.1-1.2 sec
- Up to 85 full-power flashes in a burst
- 24-200mm focal length coverage
- E-TTLII/E-TTL exposure control
- 15m wireless range
- Fully articulated head
- Weather resistant

Pros: Just as powerful as the EL-1, but half the price. Fast performance. Lots of features.
Cons: Complex controls. Quite heavy.

★★★★★ 5.0

Canon Speedlite EL-10

£329/$431/€390

This new mid-range Speedlite packs a lot of features in a compact package.

- Guide number: 40 (ISO100)
- Recycle time: 0.1-2.5 sec
- Up to 65 full-power flashes in a burst
- 24-200mm focal length coverage
- E-TTLII/E-TTL exposure control
- 30m wireless range
- Fully articulated head
- Metal mounting foot

Pros: Excellent wireless connectivity. Decent power for the price.
Cons: Not weather resistant. Not rechargeable.

3.5

Speedlite Transmitter ST-E3-RT

£239/$263/€325

A wireless flash trigger with 30m range, compatible with many Speedlite flashguns.

- Radio frequency remote flash trigger
- Fire selected Speedlites from 30m away
- Controls up to 15 flashguns
- Remote camera triggering
- Weather sealed against dust and moisture
- Unlike IR transmitters does not need line of sight to operate

Pros: Easy to use and configure. Doesn't need line of sight. Weather sealed.
Cons: No focus assist beam. Does require a post 2012 camera for full functions.

4.0

Speedlite EL-100

£199/$199/€222

Get started with flash and make better looking images easier than ever.

- Guide Number 26 (m, ISO100)
- Auto mode for simple flash shooting
- Bounce flash vertical and horizontal
- Optical sender/receiver for off-camera flash
- Zoom head
- High speed sync
- AF assist beam
- Minimum recycling time 5.8s

Pros: Great little flash to team with a smaller DSLR. Small, light, all-purpose unit.
Cons: Modelling is not supported on EOS R and M models of camera. Power might be lacking.

4.0

Macro Twin Lite MT-26EX-RT

£1,072 /$1,405/€1,272

Capture macro images full of detail with this powerful and flexible twin flash system.

- Guide number: 26 (ISO100)
- Recycle time: 5.5 sec
- Infra-red/Radio control
- Transmitter range 10m
- E-TTLII/E-TTL exposure control
- Metal mounting foot
- 4x AA batteries
- Programmable custom functions

Pros: Superb close-up flash system. Powerful flash. Flexible lighting control.
Cons: Expensive. Highly specialised.

4.5

Speedlite 470EX-AI

£454/$349/€499

With a unique motorised bounce head that automatically adjusts to control shadows.

- Guide Number 47 (m, ISO100)
- Clear dot Matrix LCD
- Auto AI bounce function
- 14mm Lens coverage via adaptor
- Auto zoom for sensor size
- Infrared wireless flash
- AF assist beam
- 1-19 AF points supported

Pros: Automatically bounces flash output. Great for beginners. Good max output. Fast recycle.
Cons: It's an expensive option for beginners. No optical, or RF master and slave modes.

4.0

MR-14EX II Macro Ring Lite Flash

£499/$539/€559

Creative macro lighting control from camera or flash.

- E-TTLII/E-TTL exposure control
- Independently variable dual flash tubes for creative lighting control
- LED modelling lamps make composition and focusing easier
- Powerful performance with guide number 14 (ISO 100,m)
- Metal hot-shoe foot

Pros: A well-built and well-designed ring lite flash. Can be used as a portrait flash.
Cons: Does not support RF capabilities. Needs mount adapter. No directional control.

4.5

The majesty of mono

Don't be a fair weather photographer. You don't always need a stunning sunrise or glorious sunny day to undertake a photography session. Sometimes, a grey day can give up the goods as well as any sunny day. It's just a case of approaching it from a different angle. If it is a lacklustre day, the shadows will be flat or non-existent and there will be very little contrast compared to a bright day. Make the most of form and texture instead. Also, perhaps you could shoot with the intent of doing a mono conversion such as the examples seen here.

UNDERSTAND YOUR CAMERA

Our guide to some photographic essentials

Modern Canon cameras are marvels of miniaturised technology, with many automatic functions to help you take good photos in a wide range of different situations. However by learning more about how your camera works and how to use its many features you can expand the scope of your photography and get good results every time, even in difficult conditions. For owners of more advanced DSLRs there are options such as aperture and shutter speed control, sensitivity and white balance, as well as creative light metering modes and manual focusing, all of which can be used creatively to make your photos really stand out. Photography is a rewarding and potentially profitable hobby, and the more you learn about it the more you'll get out of it. Read on and find out a bit more about how that expensive gadget you bought actually works and some of the main principles behind photography. ■

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72 Be the master of metering
74 The exposure triangle
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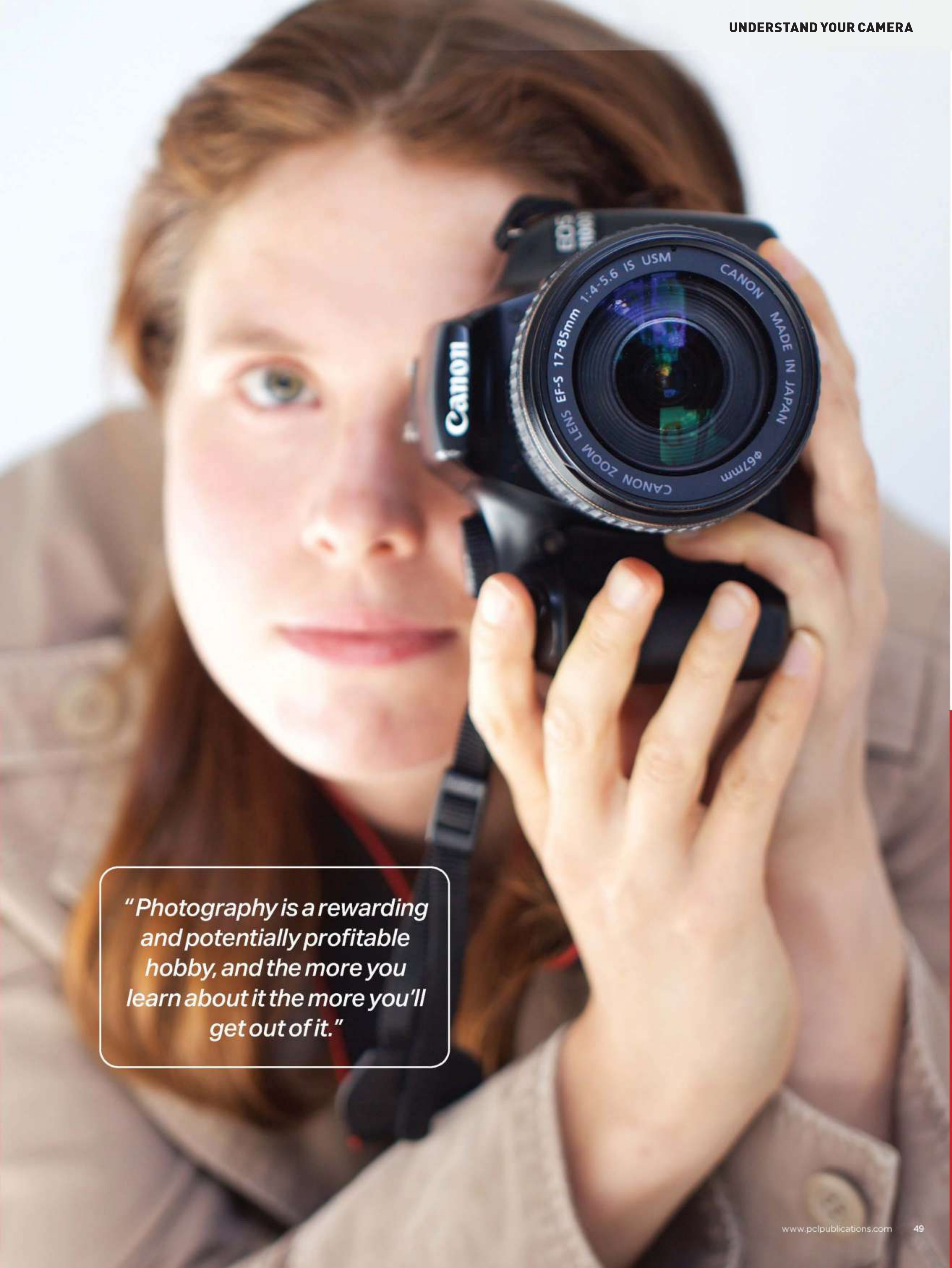
84 The inverse-square law



EOS
Canon
EF-S 17-85mm 1:4-5.6 IS USM
CANON
MADE IN JAPAN
φ67mm
CANON ZOOM LENS

"Photography is a rewarding and potentially profitable hobby, and the more you learn about it the more you'll get out of it."

Shooting modes

Getting in the right mode for the right situation

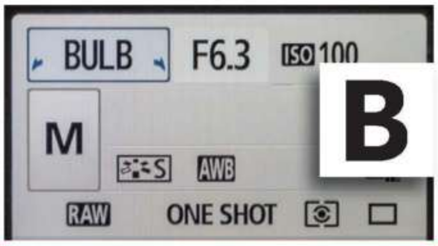
All but the most basic budget compact cameras have a selection of shooting modes, usually chosen by a dial on the top or back of the camera. Easy-to-use, mainly automatic cameras in the range will only have a few shooting modes, while the more sophisticated cameras such as the EOS DSLRs may have as many as a dozen, including manual exposure options and user-programmable special settings.

As newer models appear in the range or older models are updated, the shooting modes available will be revised and possibly expanded. Shown on this spread are some of the most often used modes selected from the mode dial on the top of the camera. ■

Auto DOF Mode: As you focus on your subject, the camera will use the other focus points to measure the distance of the other objects in the viewfinder. It will determine what the appropriate aperture setting should be to render everything in focus.

A-DEP
A-DEP
M
Av
Tv
P

Bulb Mode: Lets you control both shutter speed and lens aperture independently. Instead of a fixed shutter speed, many cameras in the range offer a Bulb shutter, allowing long exposures for as long as you hold the Shutter button down.



Manual Exposure: This mode provides the same range of exposure control as the other shooting modes, but lets you control both shutter speed and lens aperture independently for more creative control.

M
A-DEP
M
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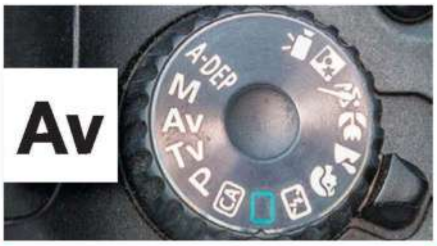
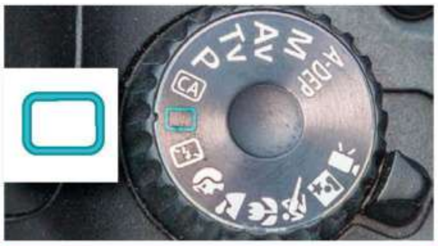
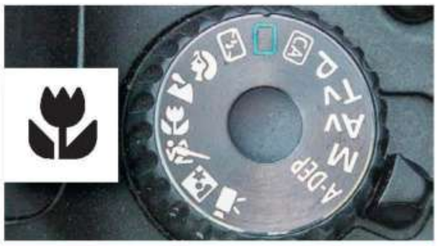
Aperture-Priority AE: This allows you to set the lens aperture, while the camera is left to select the most appropriate shutter speed. You have control over all the other exposure variables, including the control of exposure compensation.



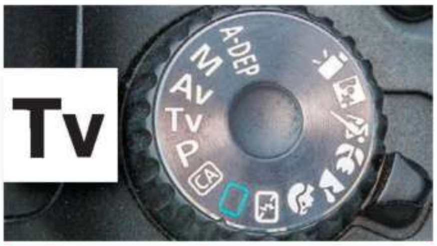
Full Automatic Mode: Full Automatic is indicated on the Mode dial by a green rectangular outline. In this mode, the camera makes all exposure decisions with the exception of image quality. Autofocus mode is set to AI Focus.



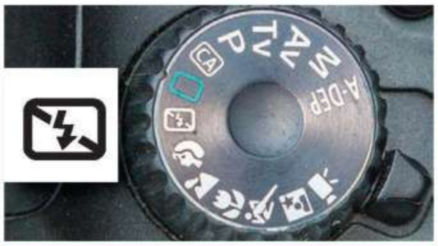
Close-up Mode (Macro Mode): Turning the Mode dial to the macro flower symbol sets the camera for capturing smaller subjects such as flowers, jewellery, and other small details. The autofocus mode is automatically adjusted to One Shot.



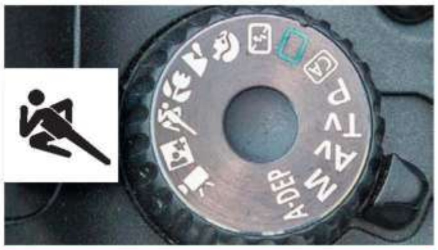
Shutter-Priority AE: You can manually set the shutter speed you want to work with, while the camera chooses the best corresponding aperture setting. You have control over all other exposure variables, including exposure compensation.



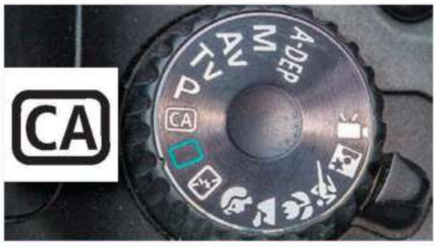
Flash Off Mode: Flash Off mode disables both the internal flash head and any external flash unit connected. Focus is set to AI Focus mode, the AF assist lamp disabled. ISO and white balance are set automatically as well.



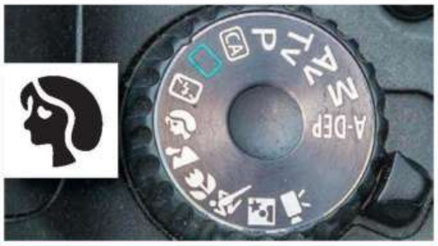
Sports Mode: This mode uses a faster shutter speed to capture fast-moving subjects. The autofocus mode is automatically set to AI Servo to predictively track your subject and keep it in focus as it moves.



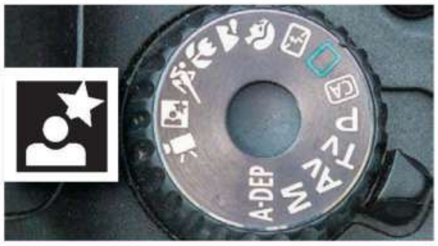
Creative Auto Mode: When set to CA mode, the camera allows the user to adjust picture style, motor drive, and exposure compensation, as well as to use the program shift function.



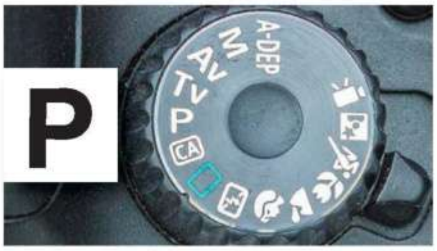
Portrait Mode: This mode uses a large aperture setting to decrease the depth of field, which blurs the background to emphasize the subject. ISO and white balance are set to Auto.



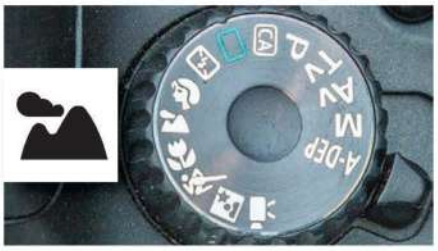
Night Portrait Mode: This mode is for taking pictures of people at sunset or at night, letting the flash illuminate the subject, while the longer exposure provides a brighter view of the surroundings.



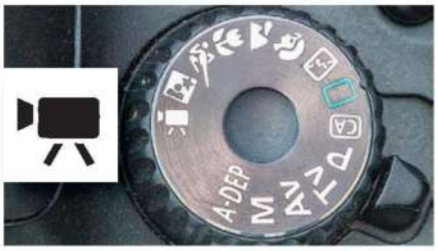
Program AE: Similar to the Full Automatic mode, but allows more control over the exposure variables. Aperture and shutter speed are automatically selected by the camera, but you can alter exposure to different apertures by turning the Main dial.



Landscape Mode: Landscape mode combines slower shutter speeds with smaller aperture settings to increase the depth of field when shooting broad panoramas and sweeping landscapes.



Movie Mode: When Movie mode is selected, the camera's mirror and shutter open, as in Live View mode, but the Live View / Movie button on the camera's back functions as the start/stop button for movie recording.



Composing your photos

Simple guides to making a good picture great

The main difference between a well taken snapshot and a truly artistic photograph is simply a matter of composition. By changing the focal length, the angle and the position of the camera, the photographer can change the relative positions and sizes of objects in the frame to produce a more visually pleasing effect. Learning to do this is mostly a matter of practice and experimentation, but there are a number of simple tips and rules-of-thumb that can help you to take better pictures.

The first and most important thing to remember is to take your time. Look at the scene in the viewfinder or on your monitor and try to see it not as simply a view but instead to imagine it as a finished print. Ask yourself if there's any way that it can be improved by maybe zooming in a little, or by moving the camera. A tripod is a very useful tool for this, since it lets you view a completely static image without the need to hold the camera steady.

The Rule of Thirds

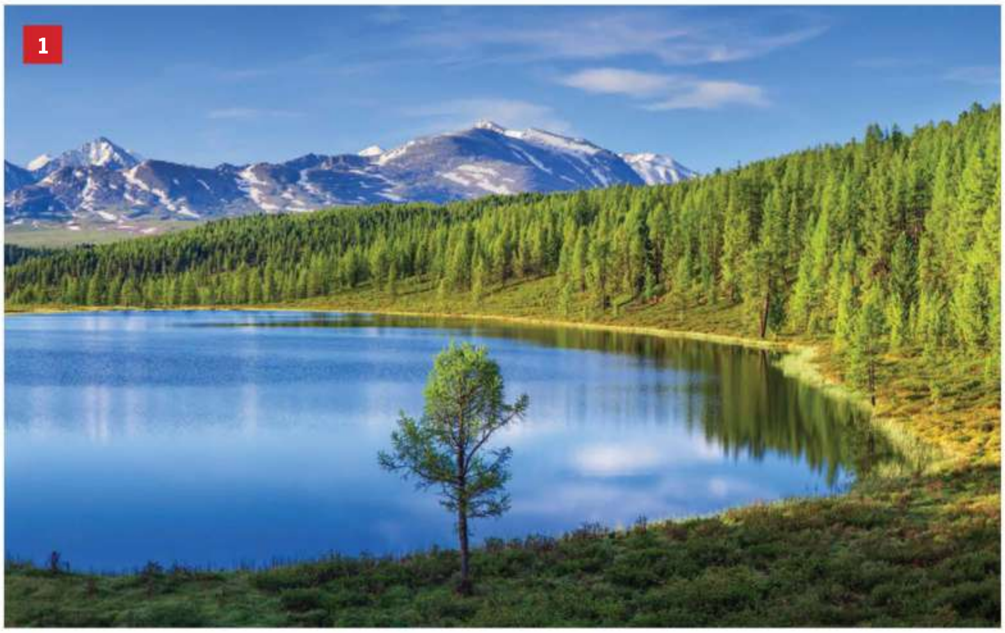
The most commonly used compositional technique is called the Rule of Thirds, and it's really very simple. Let's take a look at an example landscape picture **[1]**. It's a nice enough shot, correctly exposed, in focus and nicely lit, but now look at the next example **[2]**. Doesn't that feel better? It's obviously the same scene, and taken from roughly the same position, but this composition is much more appealing. The reason it works is because the tree is now positioned off-centre in the frame, in fact it is one third of the distance from the right to the left. This type of composition is known as the Rule of Thirds.

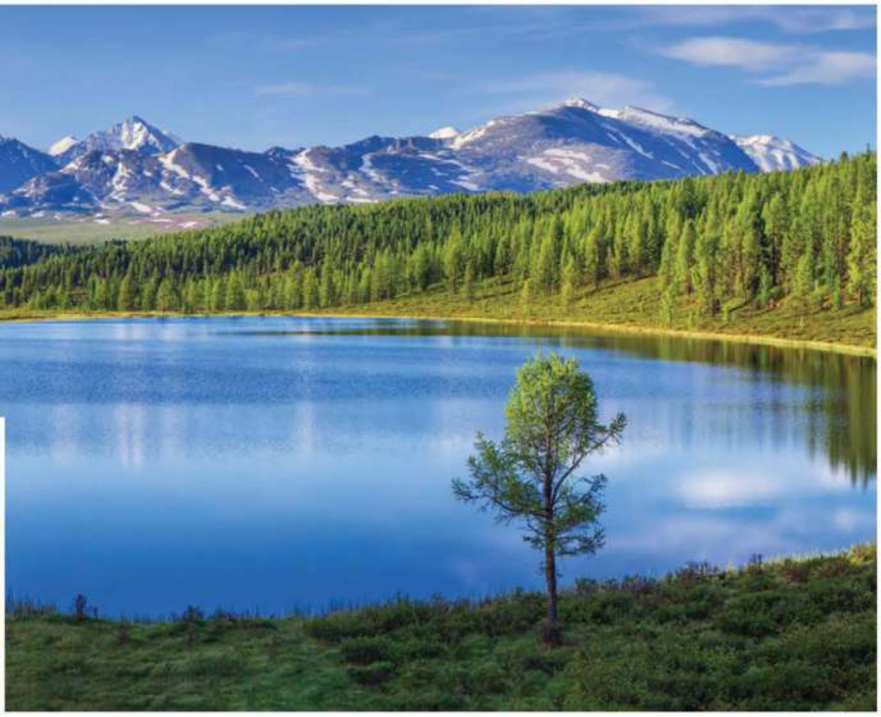
The best way to apply the Rule of Thirds is to imagine the frame divided up into thirds both vertically and horizontally, rather like a Noughts and Crosses (Tic Tac Toe for those in the USA) grid **[3]**. If you position the main elements of the image on these imaginary lines, or better yet on the intersections where the lines meet, you'll find that your image will look a lot more pleasing to the eye.

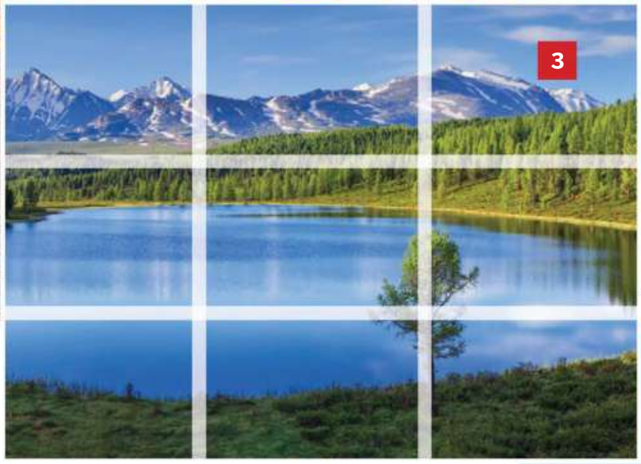
The Rule of Thirds works just as well in vertical-format shots, and is useful in landscape photography, since features on the horizon makes a natural dividing line **[4]**.

Portraits can also benefit from Rule of Thirds composition. By positioning a subject's eye at a point where the imaginary lines intersect **[5]**, will give your portrait balance and really help to draw the viewer's attention into the picture.

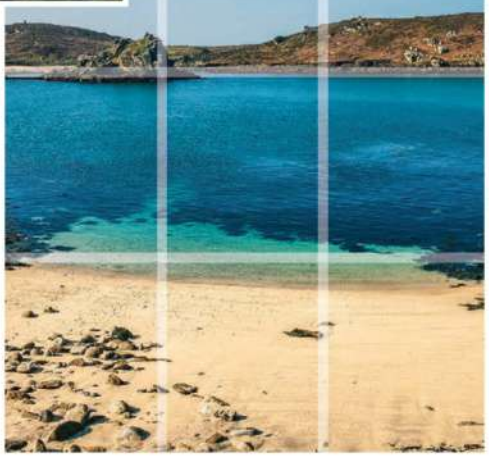
Most digital cameras feature an option to superimpose the Rule of Thirds grid on the monitor screen to make this type of composition easier. Now you know why it is there. ■

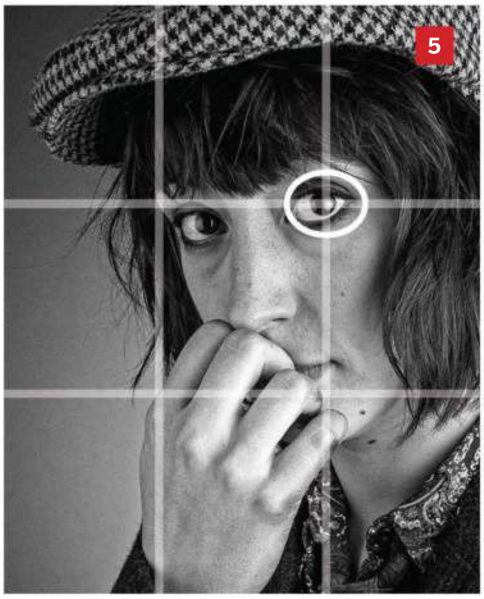






> *"Look at the scene in the viewfinder or on your monitor and try to see it not as simply a view but instead to imagine it as a finished print."*





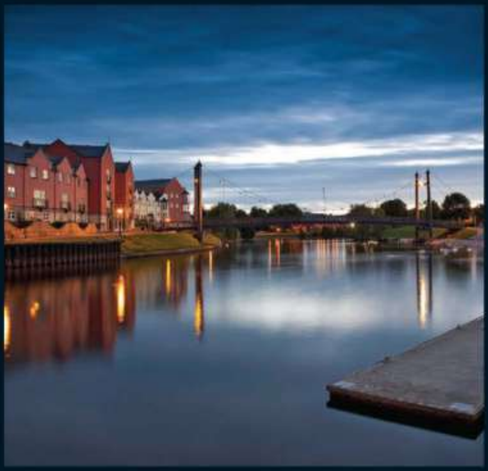
ZOOM

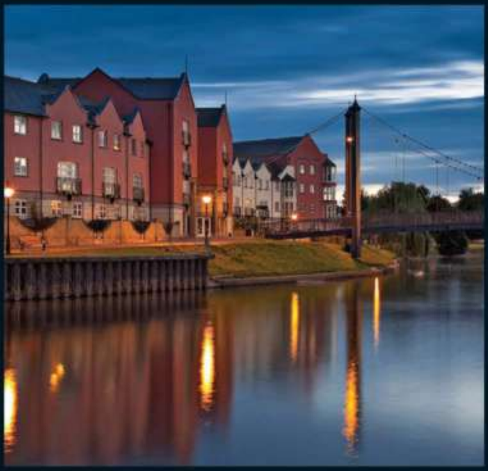
You can use your camera's zoom lens to improve composition. Below (left) is a photograph of a striking evening scene, taken with a 16mm wide-angle lens.

Whilst it does capture a striking skyline with interesting visual content, there's too much going on in the picture. The jetty in the foreground, the buildings both sides of the river and the bridge are confusing, so it becomes unclear what the subject of the shot is.

By moving a short distance and zooming in to exclude the surrounding scenery, we can get a much tighter composition (below right). Now there's no question about the subject of the photograph. The shape of the building where it intersects the sky and the river now conforms to the rule of thirds.

> *"By moving a short distance and zooming in, we can get a much tighter composition."*



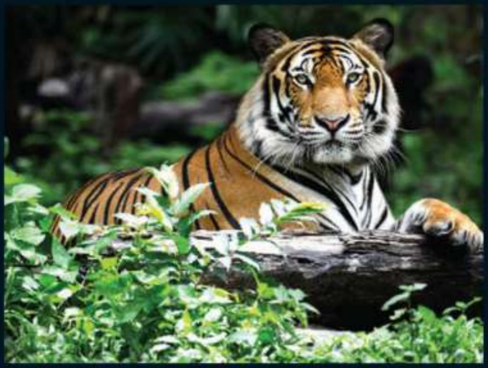


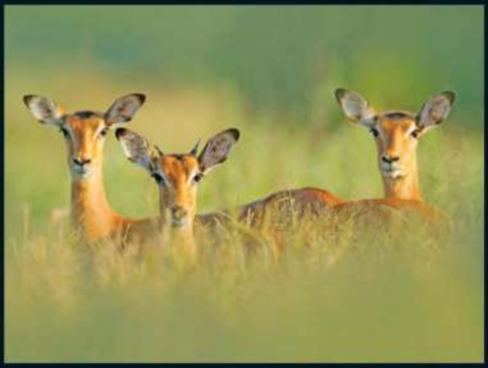
FRAMING

A less popular technique, but one which can produce good results under the right circumstances, is framing. This is where you use objects in the foreground to frame and thus emphasise the main subject of the picture. It is difficult to do well, because there is the risk that the foreground objects will distract the viewer from the main subject. However if the framing objects are sufficiently nondescript and contrast from an eye-catching main subject then this compositional technique can work very well.

In the picture on the left the framing doesn't work because too much of the foreground is visible and in sharp focus; it distracts from the subject of the picture. However, framing an image by zooming in so that only a few leaves are visible and out of focus, the effect in the right image is a lot more successful.

Thanks to the conventions reinforced by decades of Hollywood films, framed shots where most of the framing object is on the lower edge of the frame tend to look sinister, like you were stalking the subject, while a frame of overhanging foliage tends to be associated with romance, and is often used by wedding photographers.

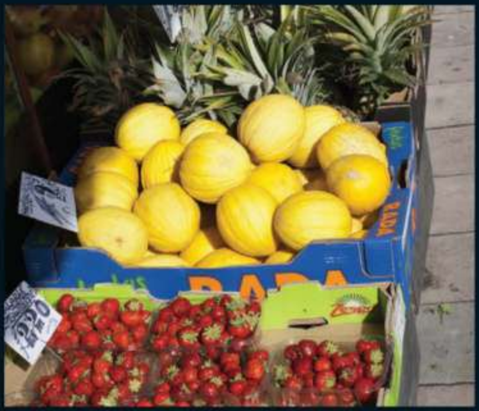




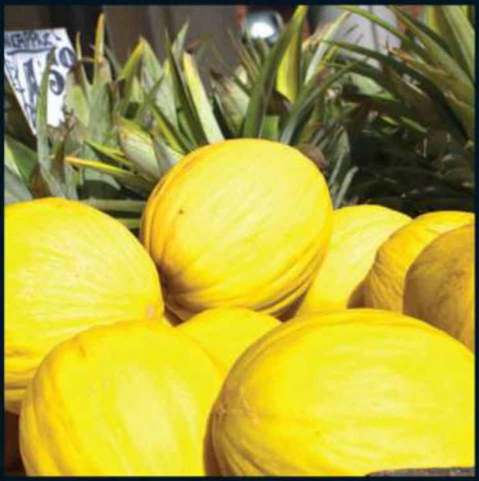
Angle

By far the most common compositional mistake is to take a photo from the wrong angle. If you see something that you think might make a good photo, don't just point the camera and snap away. Pause for a moment and think about what you actually want to see in the picture, and what would be the best way to capture it. Take this shot for example:

This display of fruit and veg outside a greengrocers has some good elements. The light is great, it has plenty of colour, and some interesting



shapes and textures. However shot from this angle it is completely uninteresting, just a random snapshot. However if we get down lower and in closer, we find this view:



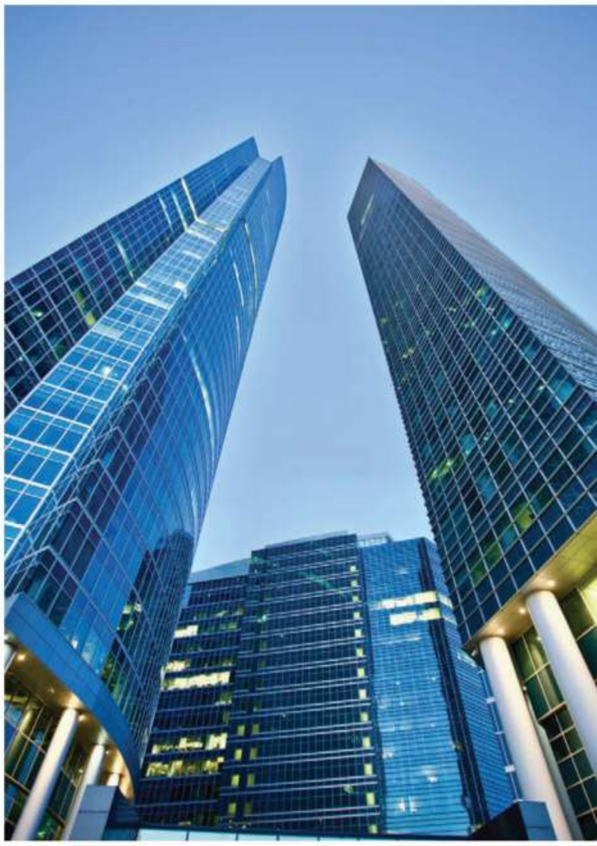
It would have been better still to have the strawberries in the shot as well, but here the contrast in shape and colour between the melons and the pineapple stalks makes for a much more striking image, and the slightly blurred price tag in the background adds a nice finishing touch.

One of the best uses for this tip is when taking photos of children or animals. If you kneel down and shoot from their height you'll get much better results than if you stand up and just snap away, because all you get then is photos of the tops of their heads. The best wildlife photographers know that to get a good picture of an animal you have to share its environment, so make a bit of an effort and try to get down closer to you subject's head height. You may risk getting your clothes dirty, but you'll get a much better shot.

When shooting children or animals, capture the world from their perspective by crouching down so that the camera is level with their head height.

Perspective

Perspective is what gives us our perception of three dimensions, and we can use this to achieve a number of different effects. Most types of perspective shots are achieved using wide-angle lenses, since the exaggerated angle of view emphasises the effect. The most common type of perspective effect is "one-point perspective". By using a wide-angle lens, groups of lines converging on a vanishing point within the boundaries of the frame can add energy to an otherwise fairly dull scene, giving a sense of movement and drama. This effect works best for photographs taken when within or surrounded by buildings, but it can also work on roads, railway lines, even rivers and beaches.



Photographs of buildings can be enlivened by using "two point perspective", photographing the building from a low angle pointing upward so that the parallel sides converge both upward and to the side, creating two vanishing points which are usually outside of the frame of the picture. This is also achieved by using a wide-angle lens to emphasise the effect, however the main danger is that many wide-angle lenses, especially the zoom lenses on compact cameras, produce what is known as barrel distortion, where parallel lines appear to curve. Better quality lenses minimise this distortion. ■

"The best wildlife photographers know that to get a good picture of an animal you have to share its environment."

FOREGROUND, SUBJECT AND BACKGROUND

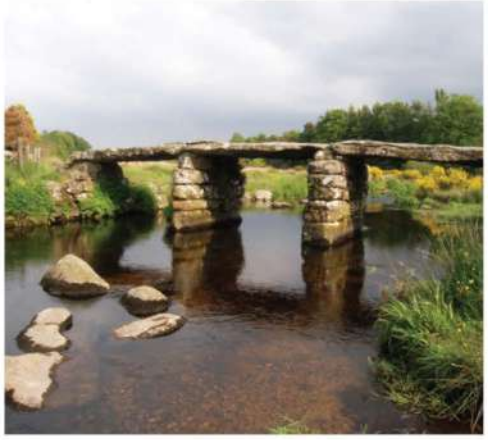
Squinting at your subject through the viewfinder of your camera, it's all too easy to overlook what else is in the frame. You're concentrating so hard on getting your subject not to blink when the flash goes off that you completely miss that tree in the background that looks like it's growing out of her head, or the discarded crisp packet lying distractingly in the corner of the frame.

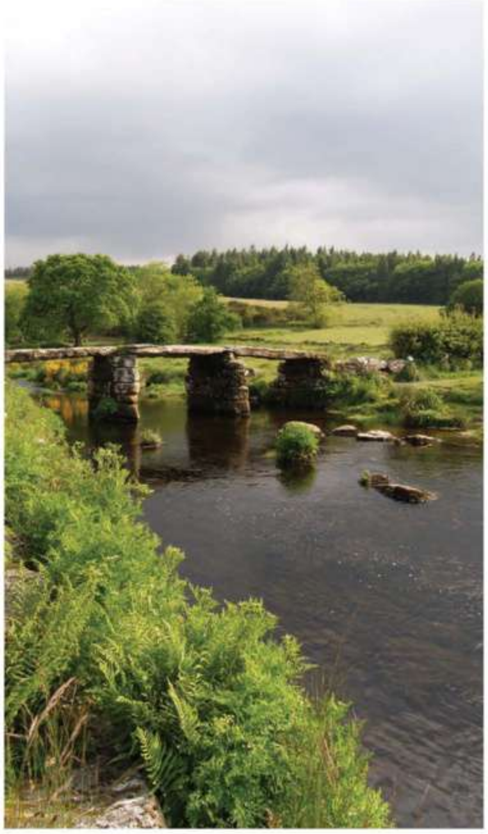
Along with your main subject, a photograph will usually have both a background and a foreground, and these are just as much a part of the image. The trick is to compose the photograph in such a way that you strike a balance between these different elements. When done properly this adds life and interest to the picture, as well as making it seem more natural.

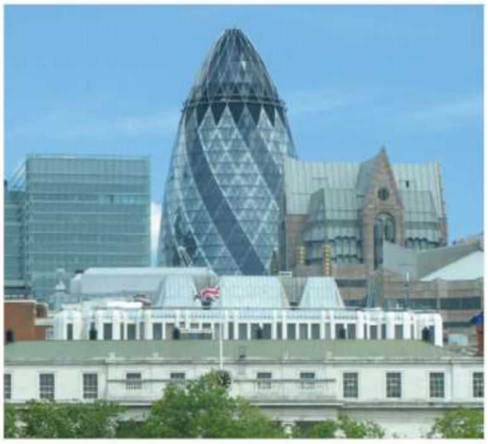
Take this photo of a famous and much-photographed Dartmoor landmark, the ancient clapper bridge at Postbridge in Devon. It's very easy to simply take a snapshot of the bridge, but that simply looks the same as the photographs that hundreds of visitors take of it every year. It's very pretty, but it's also a little dull. By including some foreground detail, and positioning the camera to capture the background of the moorland and forest, the bridge is now one element of a much more balanced shot, and one which shows the bridge in its surroundings.

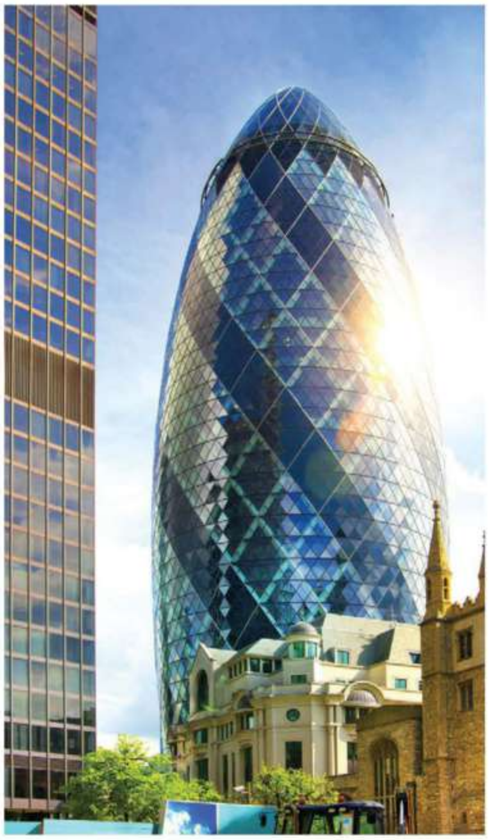
Similarly this photo of a familiar London landmark is flat and boring, and doesn't really show the building in the context of the city around it.

By choosing a completely different location we can add foreground detail the shot, and instantly it becomes more balanced and dynamic. Of course the improved weather helps too, but that's another thing to which you should pay attention when you are setting up and composing a photograph.







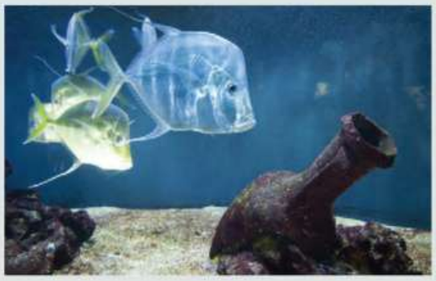


Balance

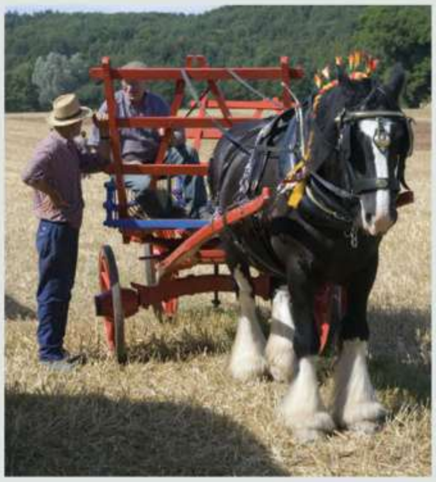
When your photograph has more than one subject you can achieve a better composition if you give each subject equal weight in the composition, so that the subjects form a harmonious balance within the frame. As with many artistic techniques it's largely a matter of practice, experience and individual taste.

Try to position your subjects so that they are the same distance from the edges of the frame, and also more-or-less symmetrically balanced around either the centre of the frame or some visible dividing line. A diagonal composition works in most cases, especially with portraits of couples. Perfectly symmetrical arrangements where the subjects are the same height within the frame tend to look forced and unnatural.

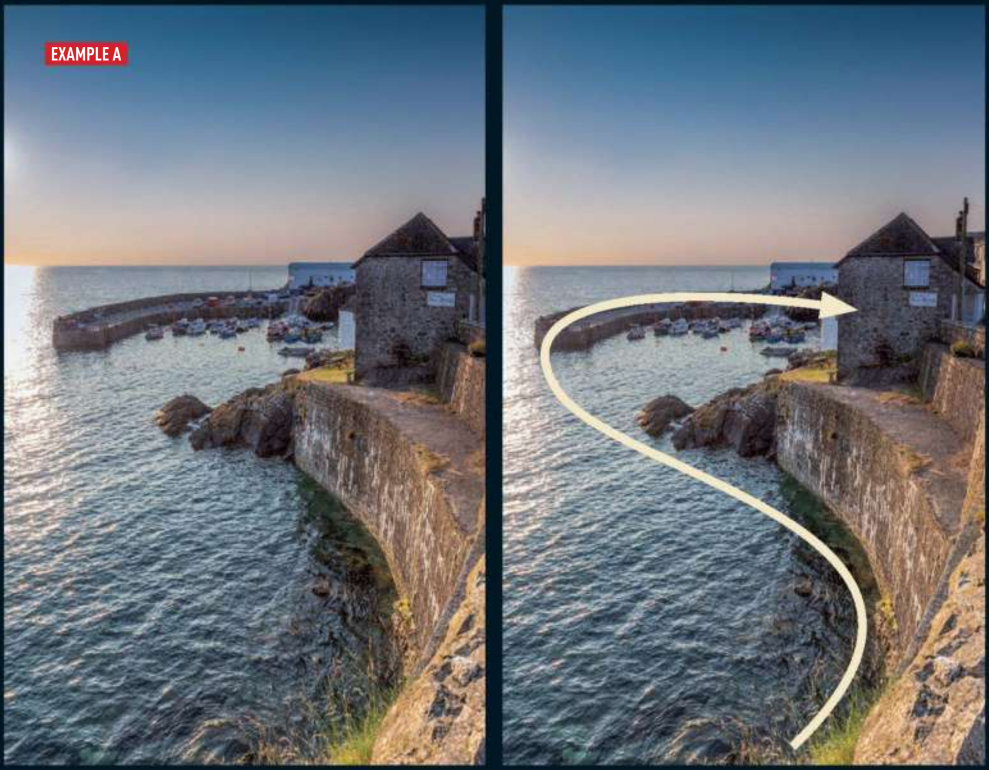
In this first example, the two fish are balanced by the stone jar in a diagonal arrangement that makes for a pleasing and harmonious composition. If you can't see it, try covering up the jar with your hand and see how dull the fish look on their own.

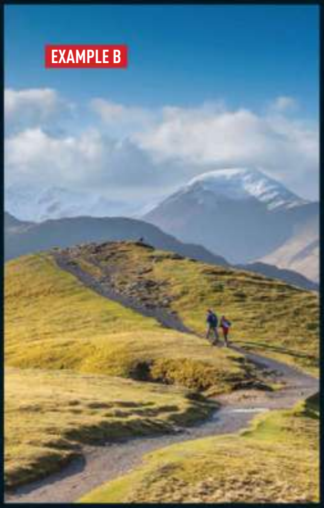


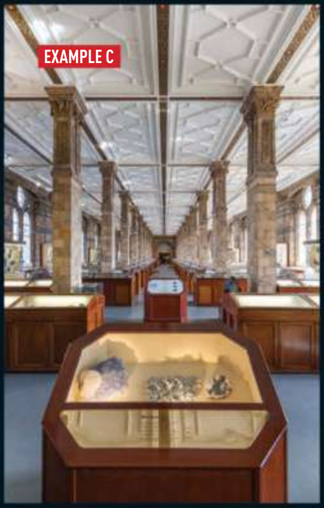
In this second example, the photo was cropped to balance the composition between the two guys talking in the background and the horse in the foreground. In this case the horse is closer to the edge of the frame, but then it is much bigger and closer to the camera, so it looks more natural that way.

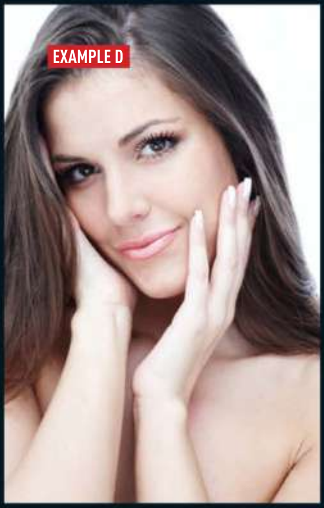


LEADING LINES









Closely related to perspective is the concept of leading lines. When you look at a photograph for the first time, your eye will naturally be drawn to certain areas. It is possible to subtly lead the viewer's eye around the image to areas of interest using the visual cues of line and perspective.

For some reason best known to anthropologists our eyes find broad "S" shapes very appealing, so any feature in a photograph that resembles this shape will naturally tend to attract the viewer's attention. The eye naturally tends to follow the S-shape into the picture, usually starting at the closest and/or lowest point and moving upward. Many features can be used to create leading lines, but favourites include rivers, streams, footpaths, roads, hedgerows, or the line of surf on a beach. In figure or portrait photography, the line of the limbs, hands, hair or items of clothing can also be used to create leading lines that draw the eye into the photo.

In example A, the elevated angle allows the long curving line of a harbour wall to form a leading line drawing the viewer into the picture. Leading lines are most often used in landscape photography, because so many natural features make those appealing S-shapes. In example B the line of the path leads the eye up past the hikers to the mountains beyond.

Leading lines don't have to be S-shaped curves, straight lines can work as well. In example C, the perspective of the walls, the ceiling decorations and pillars draw you from the front of the shot down the corridor to the exit. Use leading lines to emphasise a particular point in a photograph, or to highlight a particular subject in a busy environment.

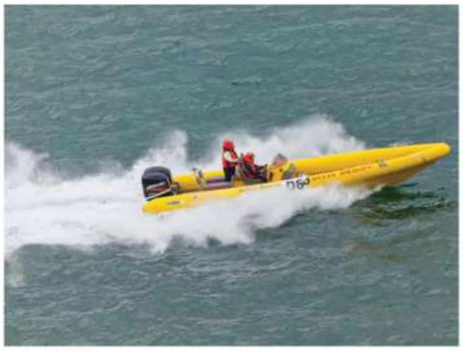
In this studio portrait shot (example D), the position of the model's hand and the line of her hair combine in a leading line directing the viewer's attention to her eyes.

Implied movement

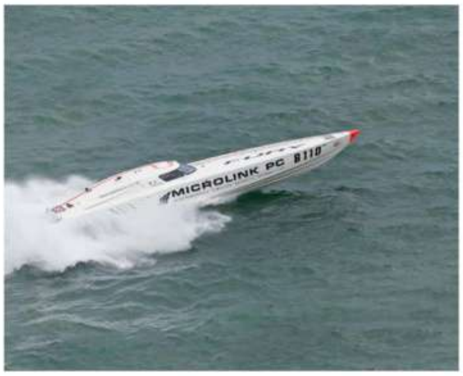
A photograph freezes a moment in time, which is great if your subject is a stationary object or person, but what if your subject is moving? How can you capture movement in a still image?

There is a technique involving a slow shutter speed and panning the camera to follow the movement, but it's difficult to master and only works about one time in ten anyway. Far easier is freezing the action with a nice fast shutter speed, and using a subtle compositional trick to simulate movement.

The trick is very simple. Just position the moving subject within the frame so that it appears that it is moving into the middle of the picture. For example, if you are photographing a boat moving from the left to the right, position it on the left of the frame so that it is moving inward towards the centre, leaving room in the frame into which the boat could move. The best way to illustrate this effect is with a couple of examples. Take a look at this shot:



Here the boat is positioned incorrectly, and appears to be about to exit out of the picture. There is a lot of empty space on the left of the picture, and it looks awkward and unbalanced.



In this shot, the boat is moving into the picture, giving it better balance and a dynamic feeling of speed and movement. If you look at pictures by professional sports photographers, you'll see this technique applied to everything from sailing boats to football players. ■

Focusing

Getting the best out of your autofocus system

With only one or two exceptions, all current digital cameras have automatic focusing. The first autofocus systems were developed by Leica in the 1970s. The first autofocus compact camera, the Konica C35 AF, was introduced in 1977, and the first autofocus 35mm SLR, the Pentax ME-F, was launched in 1981. Since that time autofocus technology has improved immensely, and these days even the most basic modern AF systems are generally fast, accurate and reliable.

Although we now rely on autofocus for the vast majority of photographs, anyone who has tried taking a photo in low light, with fast-moving subjects or using very long telephoto lenses will have noticed that sometimes even the best AF system can run into problems. We've all stood there with the lens whirring in and out of focus, trying to get a lock on our subject, and eventually missed the shot. It's very frustrating when this happens, but with a few simple tips you can help your camera to focus quickly and accurately even in difficult situations.

There are two main types of autofocus system in common use today. All compact cameras and most CSCs use something called contrast-detection AF, which samples the image from the main picture taking sensor and detects sharp high contrast edges in the details of the scene. Meanwhile all digital SLRs and Sony's new SLT cameras use something called phase-detection AF, which uses an array of separate dedicated sensors usually mounted below and in front of the main imaging sensor. Phase detection is a more complex system, but it is usually much faster, more accurate and works better in low light. However both systems require some detail in the scene to 'lock on' to. Try it for yourself: point your camera at a plain wall or a sheet of white paper and see if it will focus on it. Even if you own a top-of-the-range DSLR it won't be able to focus on a featureless surface.

> *"Autofocus technology has improved immensely, and these days even the most basic modern AF systems are generally fast, accurate and reliable."*

There are a couple of ways to help your camera to focus quickly on a scene. Most digital cameras have the option to select either single or continuous autofocus. Your camera will normally start to focus on the scene as soon as you half-press the shutter button. In continuous focus mode it will continue to update the focus if you

By carefully focusing on just one part of the scene, and using limited depth of field, you can draw attention to it.

then move the camera, but in single AF mode it will hold the same focus setting as long as you hold down the button, until you actually take the shot. You can use this to focus the camera on low detail targets by finding an object in the scene that's the same distance away as your chosen subject, focusing on that, and then holding the focus and reframing the shot. Similarly you can use it in reverse to focus on objects that aren't in the centre of the frame.

Moving targets

Compact camera AF systems are usually somewhat slower than those in DSLRs, which means they can have a real problem focusing on moving subjects. The way around this is either to use continuous AF or, if your camera has this option, to use manual focus. If you can tell where your subject is going to be, such as a car going round a tight corner on a race track or a child on a swing, you can pre-focus the camera on this point and wait to take the picture at the right moment. This method takes some practice and good reflexes, but it can produce excellent results.

Close-ups

All cameras and lenses have a minimum focusing distance, a closest point beyond which they cannot focus. For many compact cameras this distance can be very small, in some cases as little as 2cm (1in), but for standard DSLR lenses the distances tend to be longer. Most compact cameras have a 'macro' setting, usually denoted by the symbol of a flower. To get closer focusing with a DSLR or CSC, special close-focus macro lenses have to be used.

Depth of field is greatly reduced at very close focusing distances, and you may find that your AF system doesn't focus on the right part of the subject, for example if you are trying to photograph the centre of a flower, but the AF focuses on the petals, because they're closer. The best option is to use a tripod, and manually set the focus to the closest distance. Move the tripod until the front of the subject comes into focus, then carefully manually adjust the focus point to get the right part of the flower to look sharp. ■

FULL
∞
10m
10m-2.2m
AF
MF
VC/ON
OFF
VC MODE/1
2
3

Different lenses have different minimum focusing distances, but many modern zoom telephoto lenses also have macro-focusing capabilities for close-ups.

Get to know your autofocus modes

AF-A

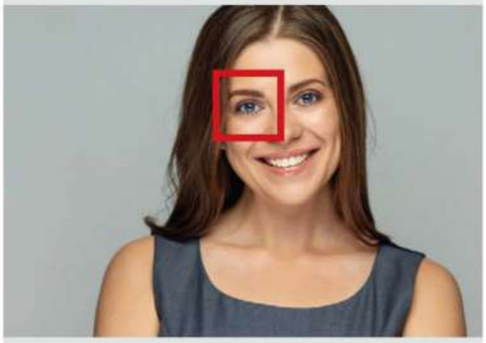
AUTO-SERVO AF

The camera decides which focusing mode to use and can work to best effect if your camera has a larger number of AF points. It will assess the scene based on its content and use all the AF points to focus the shot.

AF-S

SINGLE-SERVO AF

You can lock the focus by half-pressing the shutter release button. This allows you to select a focus point and recompose the shot. It is good for simple static subjects where you can focus once and know your subject is not going to move.



AF-C

CONTINUOUS-SERVO AF

This time, when you press the shutter button halfway, it starts to track and continually focus on the subject beneath the selected AF point. This mode is good for tracking a moving subject such as in sports events.

Shutter speed

The shutter of your camera is simply a mechanical barrier

The shutter of your camera is simply a mechanical barrier that prevents light from entering the camera until it is needed, controlling when and for how long light is allowed in to expose the sensor. The latest digital cameras have high-speed electro-mechanical shutters capable of timing exposures with an accuracy measured in fractions of a millisecond.

Along with the aperture setting and the sensitivity control, shutter speed is one of the three ways that photographic exposure is adjusted. When a picture is taken, the shutter is opened for a precisely measured amount of time allowing light to pass through. The duration of the exposure is set either automatically by the camera's light meter or manually by the photographer. The wider the range of available shutter speeds, the greater the creative versatility of the camera.

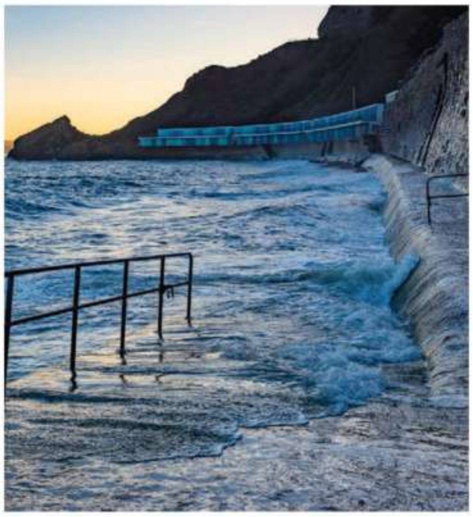
Modern digital SLR cameras have a very wide range of shutter speeds available, usually ranging from 30 seconds to as high as 1/8,000th of a second, and most also have a 'B' setting, in which the shutter stays open for as long as the shutter release is held down. The 'B' is from bulb. Very old cameras commonly used an air-bulb attachment as a remote shutter release.

Shutter speed can be manually adjusted in either full manual exposure mode or in shutter priority mode, the latter usually denoted by an 'S' or 'Tv' on the exposure mode dial. Shutter priority is a semi-automatic exposure mode in which the photographer sets the desired shutter speed, and the camera's exposure system adjusts the aperture accordingly to produce the correct exposure.

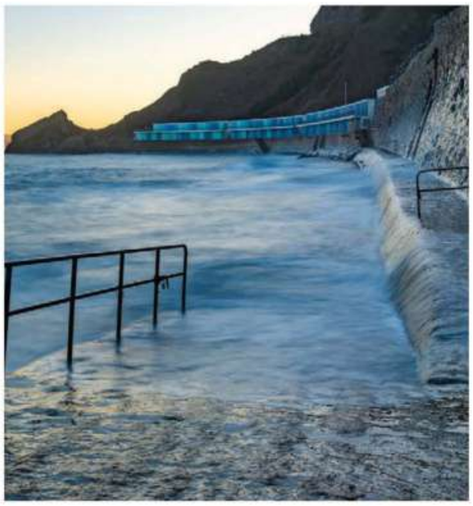
In automatic and program exposure modes the camera will set both the shutter speed and aperture automatically. Under normal daylight conditions, the shutter speed will usually be set to between 1/125th and 1/1000th of a second, since this is fast enough to freeze most movement and to reduce the effects of camera shake. However in low light conditions the camera may set a slower shutter speed, and with this comes an increased risk of movement blur caused by camera shake. Most cameras will display some sort of warning if this occurs. ■

> *"The wider the range of available shutter speeds, the greater the creative versatility of the camera."*

The misty water effect



One of the most effective uses of long shutter speed is photographing flowing water. It's a beautiful if slightly over-used effect, but it is very easy to achieve. Any moving body of water, flowing stream or waterfall will do, as long as it has white splashing water. This scene is Meadfoot beach down on the Torquay coast in the south west of Devon.

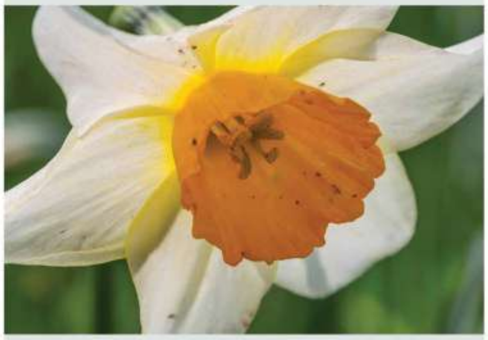


If you just point the camera and shoot on automatic, you'll end up with something like the top example. It looks nice enough, but it's a bit dull. It was shot with a shutter speed of 1/200s and an aperture of f/5.6.

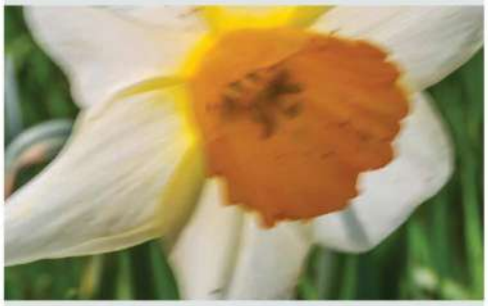
Fixing the camera on a tripod eliminates camera shake. You now need to get the slowest shutter speed you can. The image above was taken from the same position as the top example, but with the addition of a 10stop ND filter to give a shutter speed of 4 seconds at the same aperture of f/5.6.

Avoiding camera shake

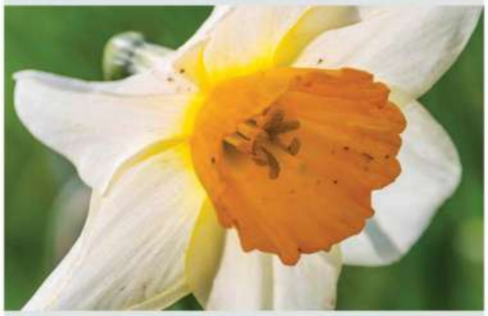
When shooting hand-held and wishing to avoid camera shake, as a rule of thumb you can safely use a shutter speed roughly equivalent to the reciprocal of the focal length you are using. For example if you're using a 100mm focal length then you can take a sharp hand-held shot at a shutter speed of 1/100th of a second or faster. If you're using a 35mm focal length then 1/35th of a second is safe, and so on.



Here's an example shot taken hand-held at a focal length of 105mm and a shutter speed of 1/125th of a second. As you can see it's sharp and shake free.



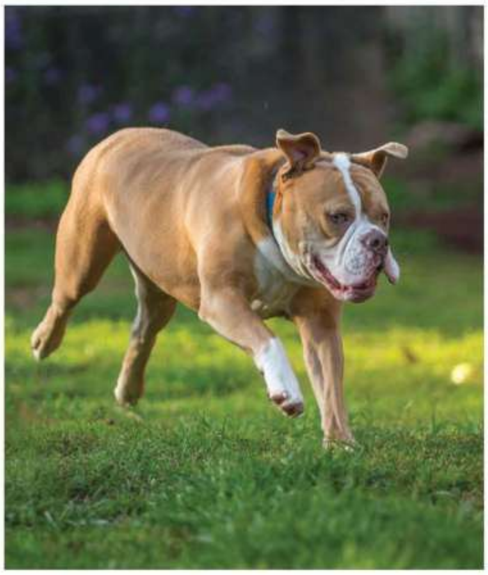
Here's the same hand-held shot at 1/10th of a second. At this speed it's virtually impossible to hold the camera steady enough for a shake-free shot. As you can see, the result is blurred.



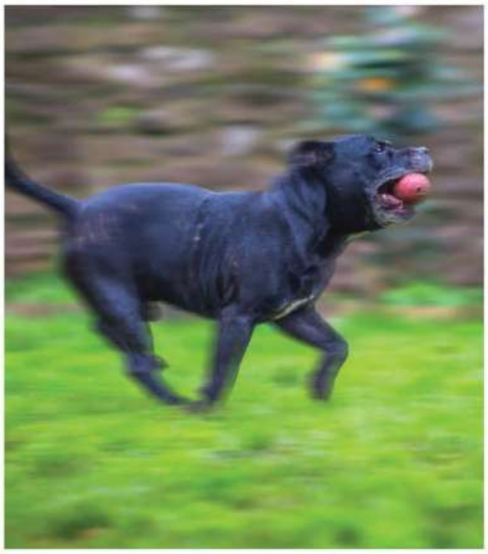
This example shot was taken with a focal length of 105mm at 1/10th of a second as before, but this time the image stabilisation (in this case a sensor-shift system) is switched on. It has detected the vibration and corrected it by moving the sensor to compensate, resulting in a much sharper shot.

Capturing movement

Freezing the action with a fast shutter speed produces a nice sharp image, but sometimes you might want to allow a controlled amount of movement blur to show that the subject was in motion. Below is a quick guide showing how this can be accomplished quite easily.



In this first example, the camera was tracking a dog called Mabel who was running after her ball. She was running fast from left to right and a shutter speed of 1/1000th of a second was enough to freeze her movement. Shutter speeds of this short duration are often used in sport and various action events to capture a very brief moment during a frenetic sequence.

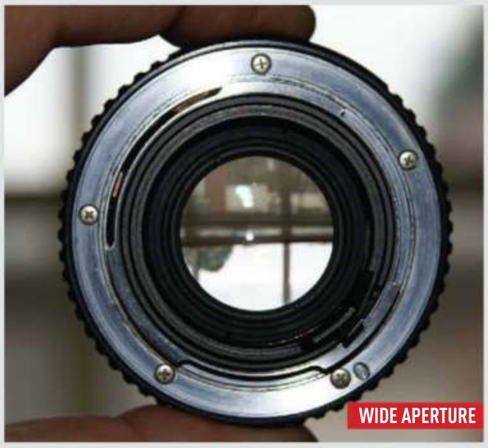


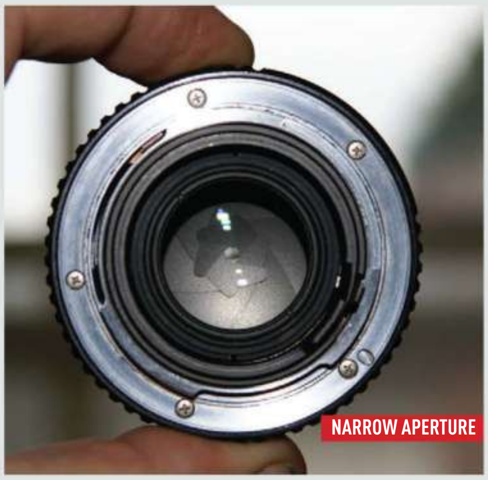
This image of Cash, who was trotting towards his owner, uses deliberate motion blur. In this case, a shutter speed of 1/60th of a second was used, but the camera was also panned to match the speed and direction of travel of the dog. This allows the background to blur but keeps the dog relatively sharp.

Using a very wide aperture and precise focusing, emphasis can be given to one subject to effectively isolate it from its surroundings.

Aperture and depth of field

With aperture you can control how much of your picture is in focus





Of the three main controls common to nearly all cameras, shutter speed, focus and aperture, it is aperture adjustment that is the least well understood. This is because it not only helps to control exposure, but also affects something called Depth of Field. Understanding the effects of aperture size is a vital skill for any keen photographer.

At least there's nothing mysterious about the name. The aperture is literally a hole through which light passes after it enters the lens. The diameter of this hole can be altered, allowing a greater or smaller amount of light to pass through on its way to the sensor. In the early days of photography, aperture was adjusted by slotting cards with different sized holes cut in them into the body of the camera behind the lens. These cards were known as 'stops', and this is still part of photographic terminology today. On modern cameras the aperture is controlled by an arrangement of curved shutters inside the body of the lens, which move to produce a continuously variable aperture, however the aperture settings are usually still referred to as 'F-stops'.

Aperture adjustment is used in combination with the shutter speed and ISO sensitivity to control photographic exposure. However it is also the primary means of controlling something called depth of field, a concept that may need a bit of explanation.

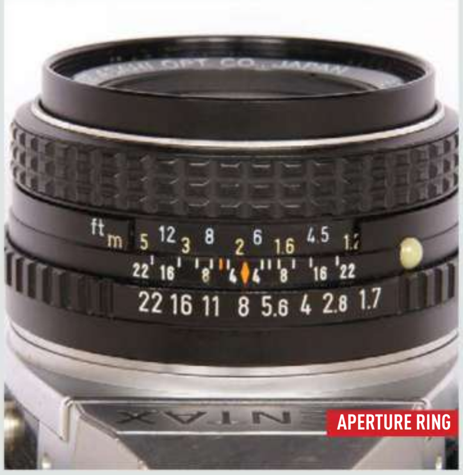
If you take a photo of a subject at a distance of about 3 metres with standard zoom lens, in good light with the focal length set to about 30mm, as

> *"Understanding the effects of aperture size is a vital skill for any keen photographer."*

long as the lens is focused correctly the subject should appear nice and sharp in the image. However you'll usually find that objects about 1.5m in front of the subject, and for about 4 or 5 metres behind the subject, also appear sharp. This distance, from the closest point of acceptable sharpness to the most distant, is known as the depth of field.

By altering the size of the aperture it is possible to control the extent of this depth of field, either reducing it so that only the main subject is in sharp focus, or expanding it so that an entire landscape can appear to be just as sharp.

If you have an older camera to hand, take a look at the lens. It will have a ring for controlling the aperture setting, labelled with numbers usually from about F2 to about F22. The focus control ring will have distances usually calibrated in feet and metres, and alongside it you'll usually find lines marked with the same numbers as the aperture ring, arranged in pairs either side of the focal distance mark with the larger numbers toward the outside. The purpose of this aperture scale is to help estimate the depth of field at a particular distance for any given aperture setting; with the focus set to a particular distance, anything between the two lines for the selected aperture setting should be acceptably sharp. Some older zoom lenses have a series of curved lines etched into the lens barrel for the same purpose. For some reason this scale is missing from most modern auto-focus, auto-aperture lenses, which is a shame because it makes the whole concept of depth of field much easier to understand. ■



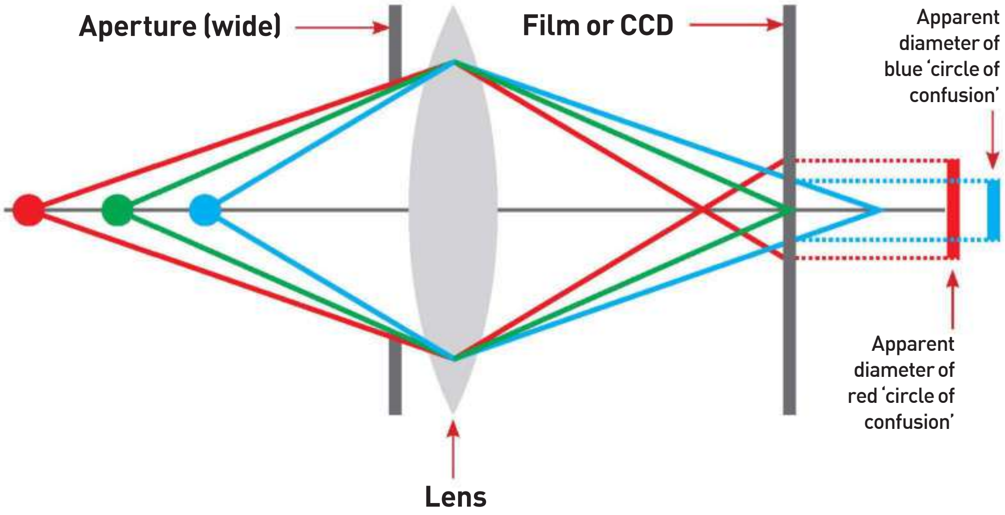
APERTURE RING

Aperture size explained

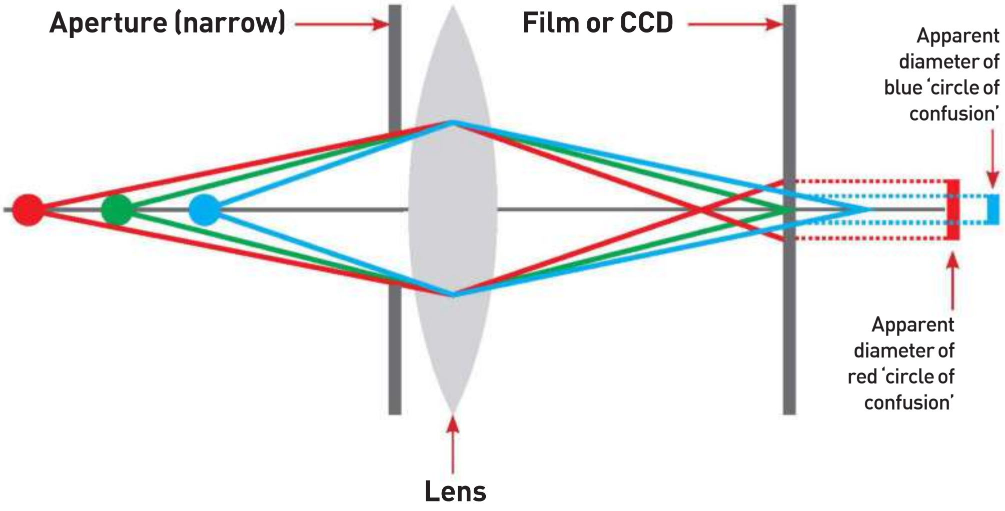
Explaining exactly why altering the size of the lens aperture alters the depth of field is a little complicated, but a few simple diagrams should help to shed some light on the matter. For a start, let's clear up some popular misconceptions about the difference between focus and sharpness.

This is a highly simplified diagram of the arrangement of lens, aperture and sensor inside a modern digital camera. In this first diagram, three subjects at different distances from the camera lens are represented by the red, green and blue dots. The lens is focused on the green spot, so light from it passes through the aperture and the lens and appears sharply focused on the sensor. Light from the red and blue spots also passes through the aperture and lens, but light from the red spot focuses a short distance in front of the charged coupled device (CCD), while light from the blue spot focuses a short distance behind it. The light from these other spots still hits the CCD, but due to light scattering it is unfocused and spread over a wide area.

What this means is that the red and blue spots will appear as large blurred spots on the final image, while the green spot will be sharp and in focus. The size of the blurred area of the red and blue spots is called the 'circle of confusion.'


Aperture (wide)
Film or CCD
Apparent diameter of blue 'circle of confusion'
Apparent diameter of red 'circle of confusion'
Lens

The diagram below shows the same arrangement of camera and subjects, and the coloured spots are the same distance from the lens, but this time the aperture has been reduced to just a small hole. Again the lens is focused on the green spot, and the red and blue spots are out of focus. However the narrow aperture restricts the light scattering and the relative angles of the light paths, and as a result the 'circles of confusion' are much smaller. This makes the red and blue spots in the final image appear much sharper. They are still out of focus, but the effect is not so noticeable. To make circles of confusion as large as in the first image, the red and blue spots would have to be much further away from the green one.


Aperture (narrow)
Film or CCD
Apparent diameter of blue 'circle of confusion'
Apparent diameter of red 'circle of confusion'
Lens

FOCAL LENGTH AND DEPTH OF FIELD

The focal length of your lens, in other words how much you zoom in on your subject, also has a large effect on depth of field. Short focal lengths have much greater depth of field than longer focal lengths. This is one reason why, when taking a portrait shot, it's a good idea to step back a bit and zoom in rather than using a wide angle lens up close.

In optics, particularly as it relates to film and photography, depth of field (DOF) is the distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image. Although a lens can precisely focus at only one distance at a time, the decrease in sharpness is gradual on each side of the focused distance, so that within the DOF, the unsharpness is imperceptible under normal viewing conditions.

In some cases, it may be desirable to have the entire image sharp, and a large DOF is appropriate. In other cases, a small DOF may be more effective, emphasizing the subject whilst de-emphasising the foreground and background. In cinematography, a large DOF is often called deep focus, and a small DOF is often called shallow focus.

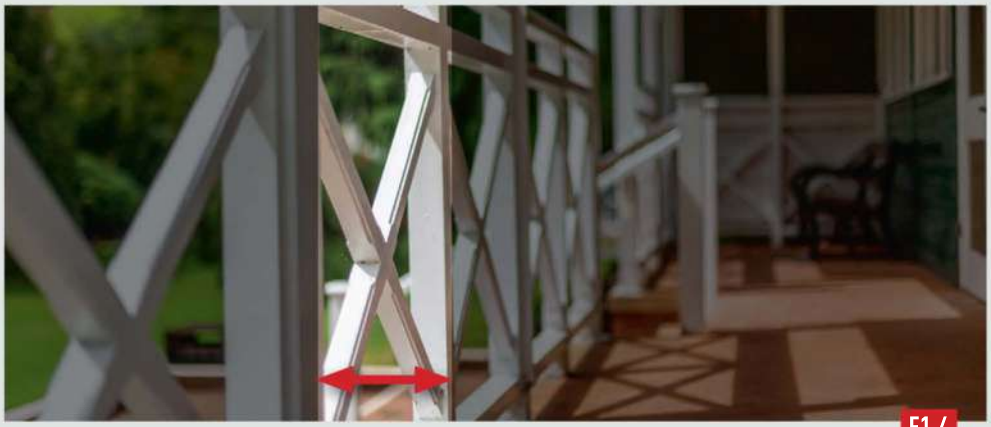
> *"In optics, particularly as it relates to film and photography, depth of field (DOF) is the distance between the nearest and farthest objects in a scene that appear acceptably sharp in an image."*

In the examples shown here, at f1.4, the second crossed wooden post nearest the camera was our point of focus. It is the only object in sharpest focus and the first post nearest camera and the third are blurred.

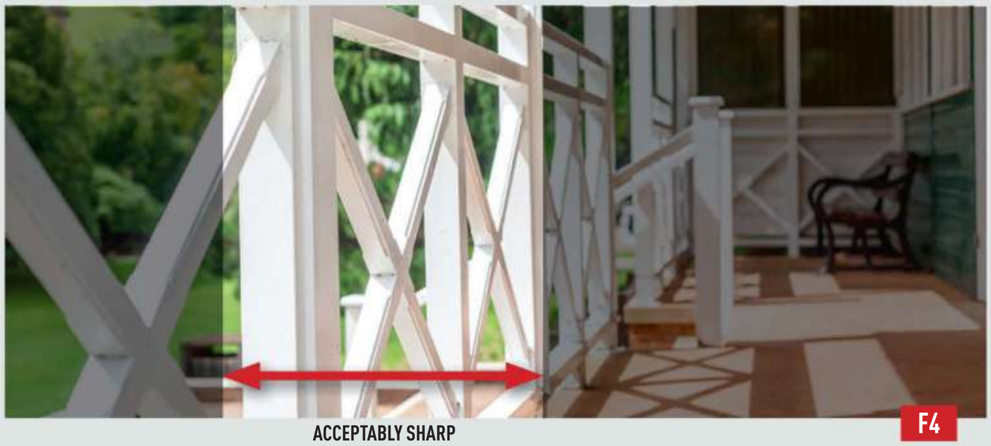
At f4 the area of acceptable focus has increased so that the first and third fence posts are starting to come into focus.

Shooting at f8 brings the first, third and fourth posts into sharper focus.

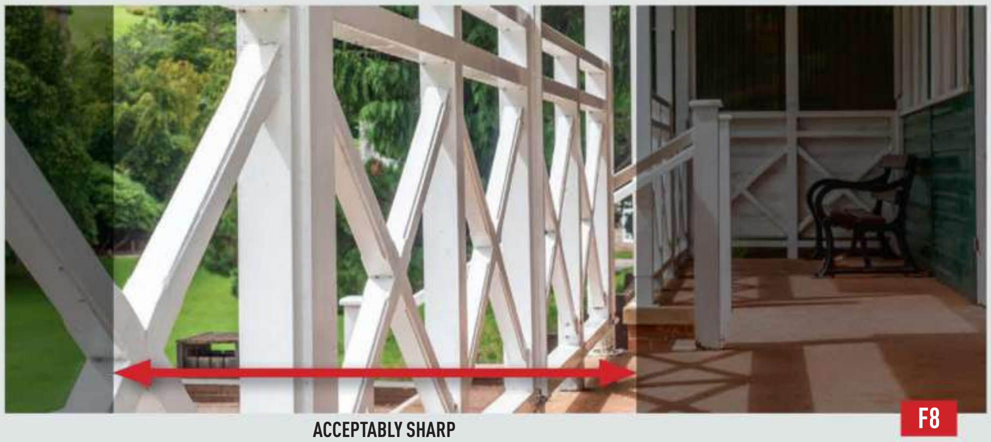
Stopping the camera down to its narrowest aperture of f22 has all four posts looking reasonably sharp, as is the bench at the back of the shot. If you were able to stop this lens down to f/32, even the foliage seen through the gaps in the fence would be sharper too.


ACCEPTABLY SHARP

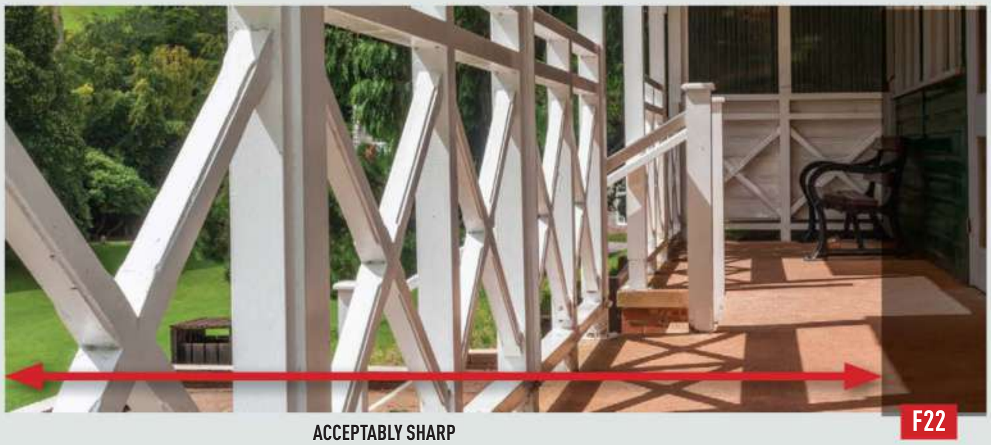
F1.4


ACCEPTABLY SHARP

F4


ACCEPTABLY SHARP

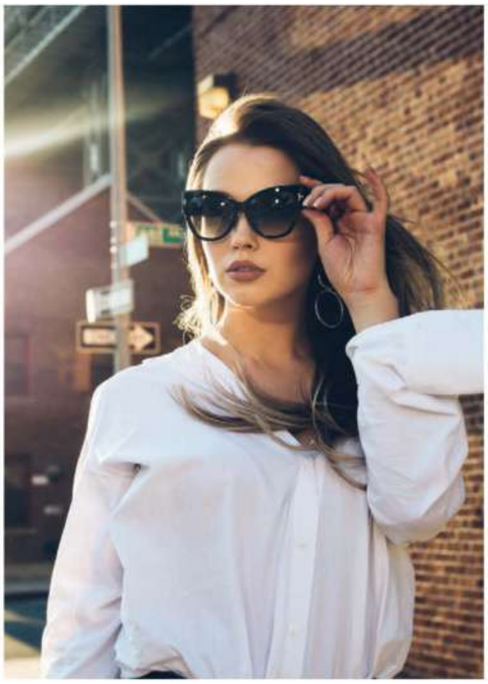
F8


ACCEPTABLY SHARP

F22

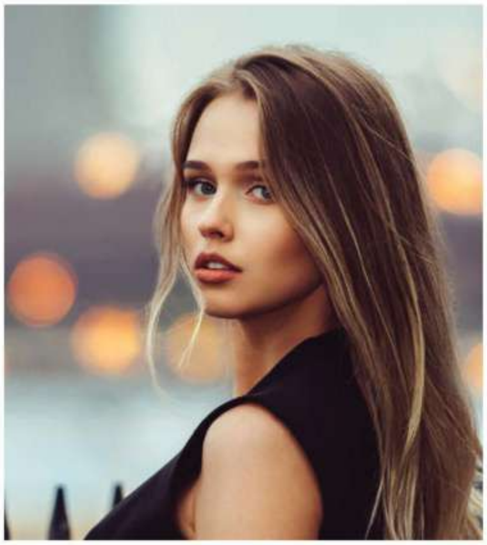
Practical uses for depth of field

There are several situations where controlling depth of field is important. The most common is portrait photography. Subjects shot on an automatic camera using a medium aperture usually have a lot of sharp foreground and background detail, which can distract attention away from the main subject.



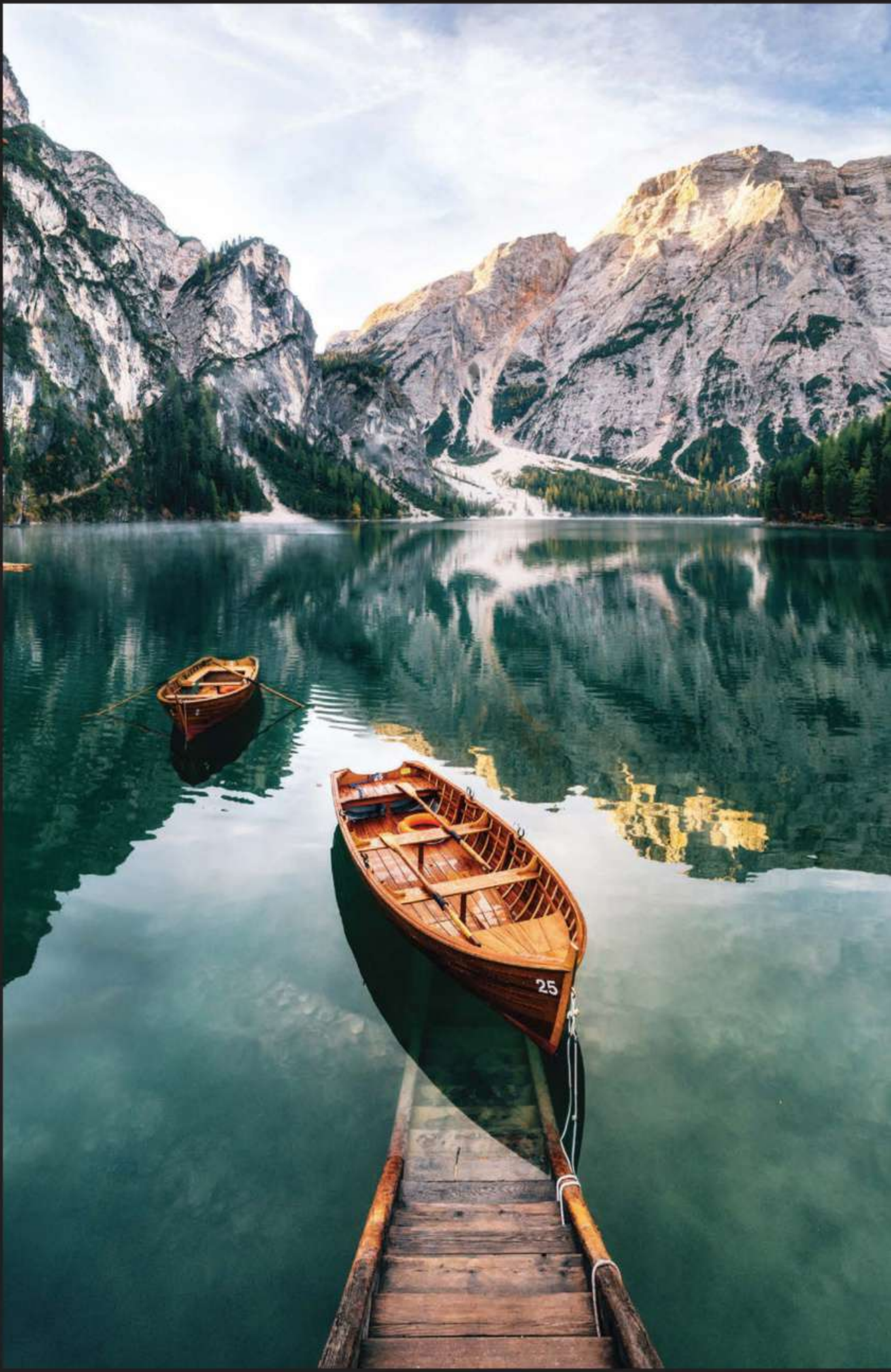
As you can see in this example, which has a large depth of field, the subject is in focus, but so is the background, which draws the viewer's attention away from the subject.

By using a wider aperture, and moving the subject further from the background, only the subject is now in sharp focus. A blurred background is much less distracting, and concentrates your attention on the subject, making the subject really stand out from the background.



LANDSCAPE PHOTOGRAPHY

Another situation in which depth of field is an important issue is landscape photography. Here it is often important to maximise depth of field, so it is usual to use the smallest possible aperture. This shot was taken using an aperture of f/16, to ensure that both the foreground and distant background are in focus. It also uses something called Hyperfocal Distance, which involves a bit of maths to calculate.



Focal length and zoom

Understanding how focal length works in composing shots

Nearly all modern compact cameras have zoom lenses, and most users of digital SLRs or CSCs will also have at least a couple of zooms in their kit. Focal length is one of your primary tools for adjusting composition. Selecting the right focal length for the scene allows the photographer to control perspective, angle of view and magnification, and can radically alter the mood and style of the photo. Some focal lengths are more suited to particular types of photo, and the properties of wide-angle and telephoto lenses can be used to produce particular effects. Understanding how focal length works and how it affects your photos is a vital photographic skill. ■

Lenses and focal length

There are two types of lens: those with fixed focal lengths, also known as prime lenses, and those with variable focal length, or zoom lenses. They both have their own advantages and disadvantages. Prime lenses are usually smaller and lighter than zooms, and also generally have much faster maximum apertures than a zoom lens at equivalent focal length. The optical quality of prime lenses is also usually a little higher than the equivalent zoom lens. Zoom lenses however are much more convenient, allowing the photographer to cover a wide range of focal lengths with just one or two lenses, rather than carrying around a bulky collection of prime lenses. There are some fast zoom lenses, but they tend to be extremely expensive.

> *"Understanding how focal length works and how it affects your photos is a vital photographic skill."*

The focal length of a lens is an expression of its magnifying power, and is usually stated in millimetres. If you look on the front of your camera, usually inscribed around the front of the lens you'll find the focal length, or a range of values for zoom lenses. For a typical DSLR kit lens this will usually be around 18-55mm. For digital cameras it is fairly usual to see two figures quoted, both the actual focal length and the 'equivalent' length. The reason for quoting both is simply that more people are more familiar with the sizes of 35mm lenses, so they know that 28mm is wide angle and suitable for panoramic shots, or that 200mm is a telephoto, suitable for long-range subjects.

Real and equivalent focal lengths are different because most digital camera sensors are a lot smaller than a frame of 35mm film, and are fitted much closer to the lens than the film would be. Most consumer DSLRs use the APS-C sensor format. Exact sizes vary from one manufacturer to the next, but are typically around 22.5 x 15 mm. A frame of 35mm film measures 36 x 24mm, which means that the edges are 1.6x longer, so the focal length of the lens would need to be 1.6x greater to produce the same image size and magnification. This is usually referred to as the 'conversion factor' or 'crop factor'. It means that a typical 18-55mm DSLR zoom lens is roughly equivalent to the popular 28-80mm zoom lens often used on full-frame 35mm systems.

Compact camera sensors are even smaller still. Because there are several different sizes of sensor in common use it is more usual for compact camera zoom lenses to be rated in terms of their magnification power, such as 3x, 4x, 10x etc. This relates to the difference between the minimum and maximum focal lengths. A lens with a range of focal length from 5.8mm to 17.4mm is called a 3x zoom, because 17.4 = 3 x 5.8.

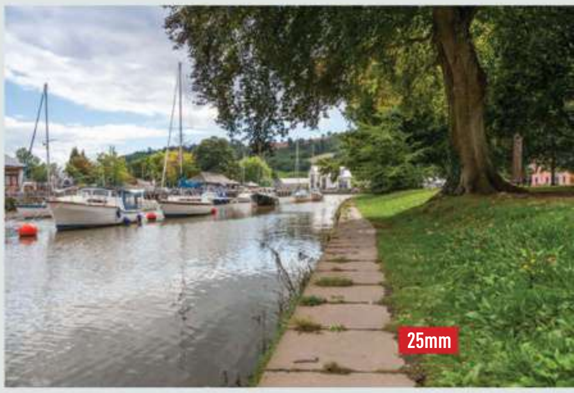
While in older prime lenses a 200mm lens would literally be 20cm long, modern optical systems use multiple lens elements working in combination, which means that the light path can be shortened while still maintaining the same effective magnification. As a result quite powerful telephoto and zoom lenses can be relatively compact.

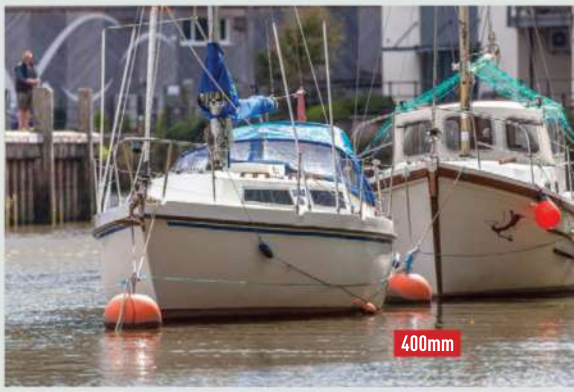
Wide-angle and telephoto are relative terms. On a 35mm film SLR a 50mm lens produces approximately the same perspective and magnification as the human eye, and has traditionally been the standard lens for this type of camera. Anything longer than 50mm is considered a telephoto, while anything shorter is considered wide angle. Digital SLRs tend to follow this rule too, although considering the crop factor the mid-point is about 35mm. ■

The shots seen in this set of examples were taken with the 24-105mm f/4 L (above) and the 100-400mm f/4-f/5.6 L zoom lenses.

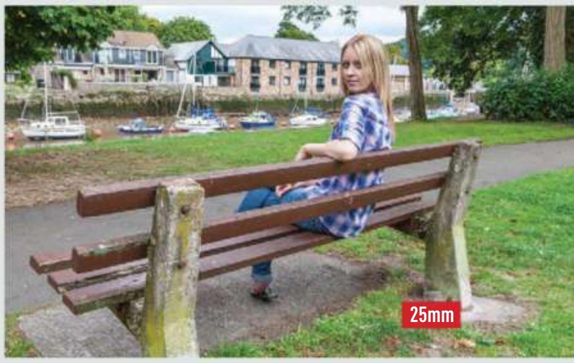
MAGNIFICATION

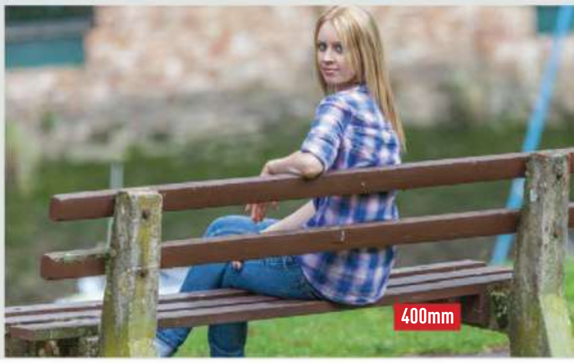
The most obvious effect of altering focal length is the change in magnification. Anyone who has ever used a zoom lens will be familiar with this effect. If you want to take a photo of something a long way away, you zoom in and the subject appears closer.





ANGLE OF VIEW





Changing the angle of view can be used to produce some interesting effects. If we move closer to the subject while shortening the focal length we can see that although the subject fills roughly the same area of the final image, in a wide angle shot a lot more of the background is included.

Hyperfocal distance

Essential for sharp photos and it's not as scary as you think

Landscape photography is one of those genres where sharpness is everything. Wide angle shots of amazing vistas usually require front to back sharpness in your scene to maintain all the detail that was present. The viewer of the final photograph will appreciate the image more if their eye is able to take in all that detail. It will make the photograph 'live' for them. Nothing ruins a shot more than the image being fuzzy and blurry when you need it to be tack sharp. The problem, however, is that in many cases in landscape photography you have a foreground element as well as a distant object that you want to be in as sharp a focus as possible at the same time. Shooting with a wide angle lens and setting a very narrow aperture of f/22 or even f/32 will yield greater depth of field; you will also run into the optical phenomenon known as diffraction, which is a softening of the image due to the bending of light rays as it passes through the narrow aperture of your lens. This means you will normally be operating around the f8 - f/16 mark when setting aperture. You may find that the depth of field provided at these apertures is not enough to render everything you need in sharp focus.

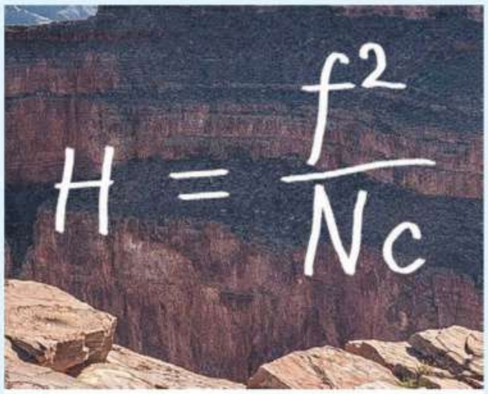
Sharp focus

This is where the hyperfocal distance comes into play. When you focus on an object, technically speaking, only that point of focus is sharp. Beyond that focus point, extending both in front and behind, is a plane of focus running parallel to the camera sensor. This area is known as the depth of field and it is this region that is deemed to contain an area of acceptable sharpness. They key to hyperfocal distance is knowing the closest distance at which a lens can be focused whilst keeping objects at infinity as acceptably sharp as possible. Everything from half the hyperfocal distance out to infinity will be in focus.

> *"Nothing ruins a shot more than the image being fuzzy and blurry when you need it to be tack sharp."*

The maths

There is a bit of assumed knowledge when using the mathematical formula. You will need to provide the focal length of the lens you are using, the Circle of Confusion value for a given sensor size, which is the largest blurred spot that the human eye can detect (usually a value of around 0.03 - 0.02 will be fine) and the f-stop you are using. There are some great apps for your mobile device that will be able to do the calculations for you, such as Lens Lab and Digital DoF for iOS and Hyperfocal for Android. If you have a calculator, and you fancy having a go yourself, you can do the following:



H = Hyperfocal distance
f2 = focal length x focal length
N = Aperture number (f-stop)
c = Circle of confusion

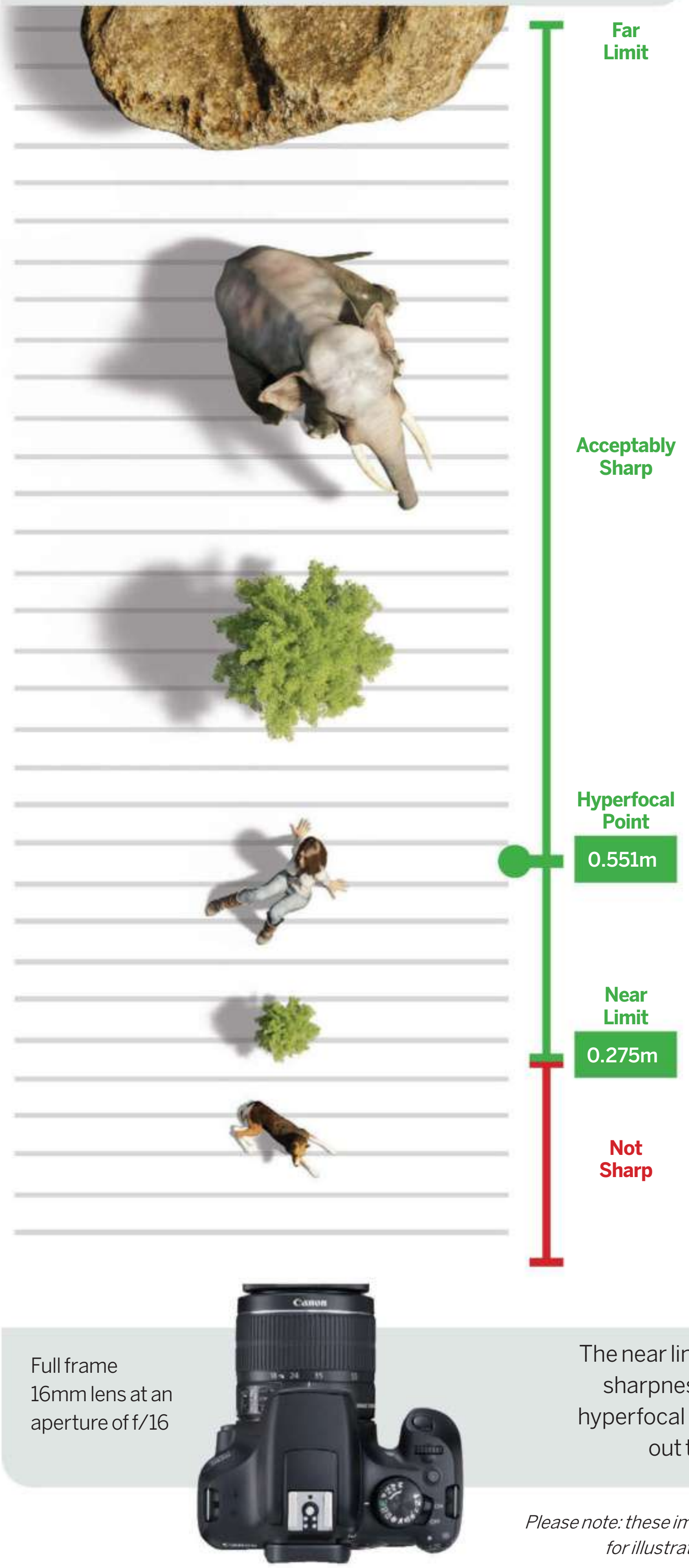
The result, in millimetres, will be the distance at which you need to focus to attain greatest depth of field. We're using a full frame camera with a Circle of Confusion value of 0.029 as an average on a 16mm lens and a 50mm lens. Both are set at an aperture of f/16. Let's try some examples as shown on the page opposite just so we can demonstrate the theory. ■

Images like this can be taken using a precise hyperfocal distance calculation. For example, a 16mm wide angle lens and an aperture of f/16 means the point of focus is only 0.5m in front of the camera's position.

Example 1: 16mm lens at f/16

$$H= \frac{16mm \times 16mm}{f/16 \times 0.029}$$

$$= 551mm\ (0.551m)$$

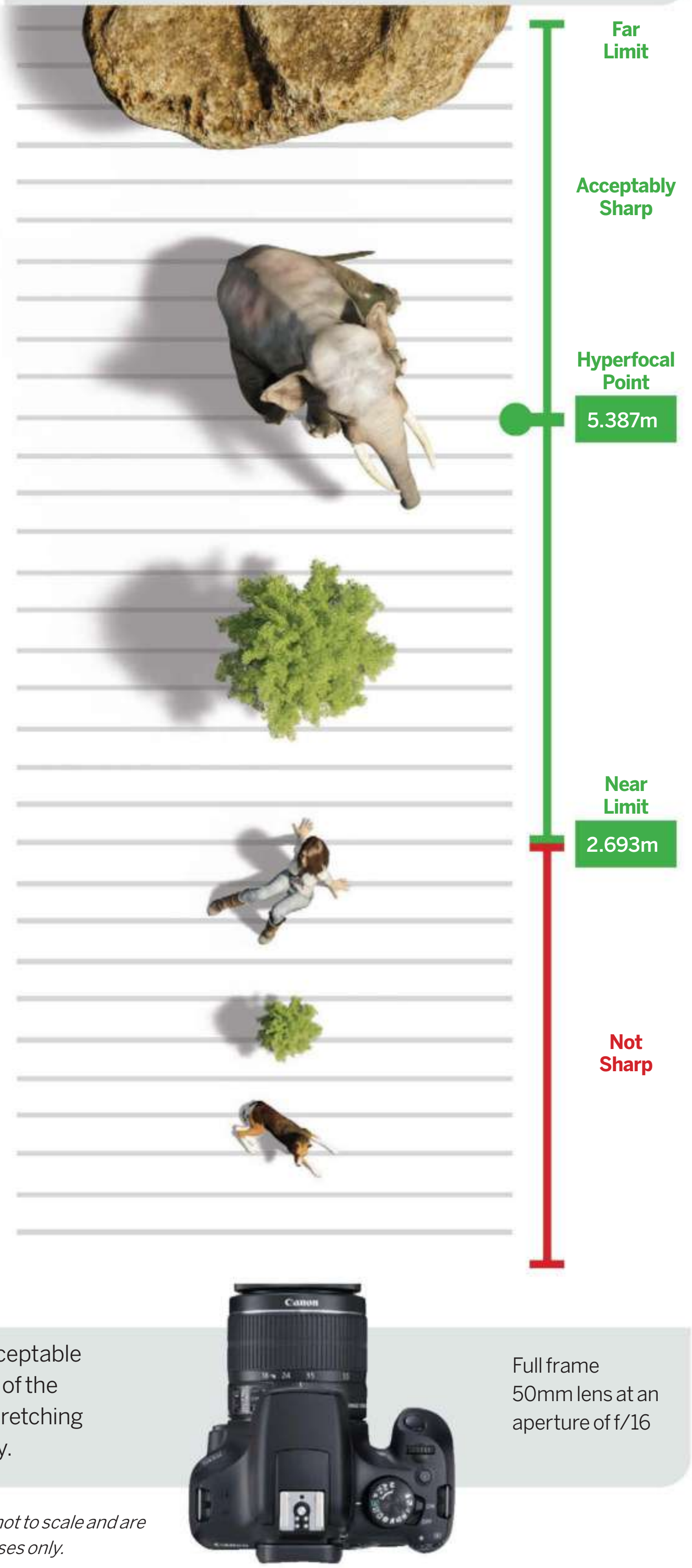

Far Limit
Acceptably Sharp
Hyperfocal Point
0.551m
Near Limit
0.275m
Not Sharp

Full frame 16mm lens at an aperture of f/16

Example 2: 50mm lens at f/16

$$H= \frac{50mm \times 50mm}{f/16 \times 0.029}$$

$$= 5387mm\ (5.387m)$$


Far Limit
Acceptably Sharp
Hyperfocal Point
5.387m
Near Limit
2.693m
Not Sharp

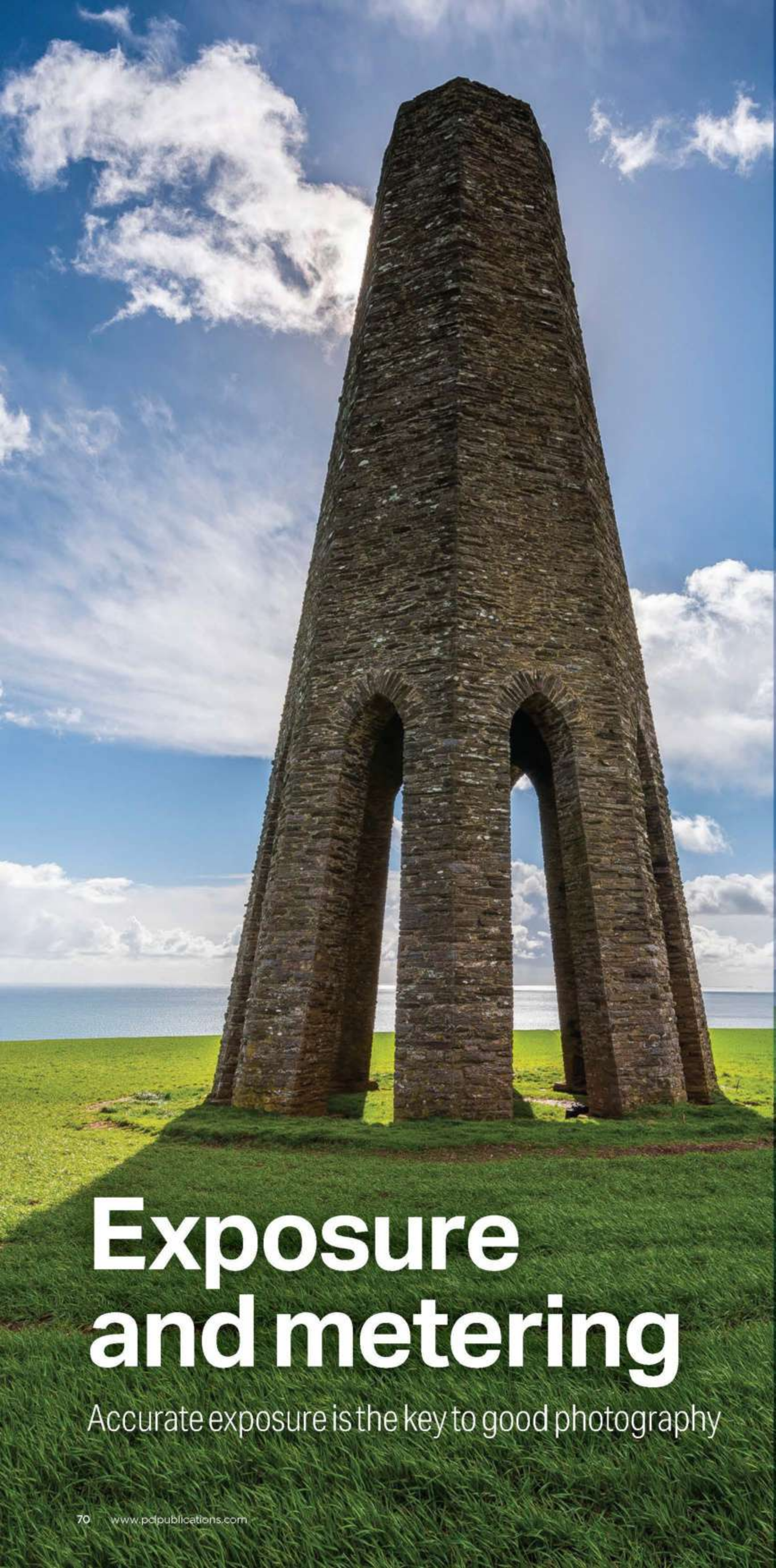
Full frame 50mm lens at an aperture of f/16

The near limit of acceptable sharpness is half of the hyperfocal value, stretching out to infinity.

Please note: these images are not to scale and are for illustrative purposes only.

Exposure and metering

Accurate exposure is the key to good photography



Understanding exposure and how it affects your photographs is probably the single most important technical skill you can learn in photography. It's certainly the one that most people get wrong, and apart from camera shake bad exposure probably ruins more photos than any other single cause. The main problem is over reliance on the use of automatic metering.

Most modern cameras, even relatively cheap compacts, have sophisticated built-in TTL multi-zone evaluative exposure meters that measure light levels at dozens, in some cases hundreds, of points within the frame, instantly comparing the results with a built-in library of exposure situations and automatically adjusting the shutter speed and aperture to deal with problems such as back-lighting, close-ups or moving subjects.

In most cases these automatic exposure systems are very good, and can reliably cope with most common circumstances. However even the best automatic meter can be fooled, resulting in poorly exposed photos. By overriding the camera's automatic settings and adjusting exposure manually we can avoid these problems and take much better photos.

Fade to grey

Take a look at this picture. What you see here is a nice scene with a good tonal range, plenty of colour, and some nice crisp sunlight. What your camera's light meter sees is this:

THE PHOTOGRAPHER'S TRINITY

Aperture, ISO and shutter speed. One always has an effect on the others. A basic principle, but an important one.

Aperture

ISO

Shutter speed

Try it out for yourself. Find any nice, average snapshot scene, properly lit and with good contrast. Start up your image editing software and open your picture. Light meters only see in black and white, so reduce the saturation of the shot to zero. Your light meter doesn't see detail, so set your Gaussian blur filter to maximum diameter and apply it a couple of times. Use the eyedropper tool to measure the RGB colour value of the resulting tone. You should find that it averages out to a mid-tone grey with an RGB value of around 127,127,127.

It's an interesting and curious fact that any average scene reflects 18% of the light falling on it. Look out of your window, and unless you live in Antarctica the scene you see is reflecting exactly the same amount of light as the scene out of my window. That 18% reflection is exactly the same as a mid-tone grey, mid-way between black and white.

Light meters are calibrated with this fact in mind. When your camera takes a light reading, the meter averages the scene and adjusts the exposure to produce that mid-tone grey (or 12% luminance, but that's another discussion altogether). If you point the camera at a black stage curtain, it will try to make the black into a mid-tone grey, so it will over-expose. If you point it at snow it will try to make the white into grey, so it will under-expose.

Adjusting exposure

Let's take a moment to explain how exposure is controlled, and what is meant by some of the terminology used.

On all cameras, exposure is adjusted by altering three basic settings; aperture, ISO and shutter speed. Between them they control the exposure of any shot.

Shutter speed is self- explanatory, it is simply the amount of time that the sensor is exposed to light. This is usually controlled by an electrically operated mechanical shutter in front of the sensor that opens and closes very quickly for a precisely measured period of time, usually in the order of a few hundredths of a second. Obviously a shutter speed twice as long lets in twice as much light, one half as long lets in half as much.

The aperture is literally just a hole through which light passes on its way to the sensor. The diameter of that hole can be adjusted to precisely calibrated sizes. A smaller hole lets in less light, and a larger hole lets in more.

These calibrated aperture sizes, for largely historical reasons, are called stops, or f-stops. An aperture setting one stop larger lets in twice as much light. For reasons that are both historical and mathematical, the standard full-stop aperture settings that you are most likely to encounter go f/1, f/1.4, f/2, f/2.8, f/4, f/5.6 f/8, f/11, f/16 and f/22. The smaller numbers refer to larger apertures, and the larger numbers to smaller ones. Many cameras can set apertures in increments of 1/3rd of a stop, but the whole-stop numbers are the ones to remember.

ISO is the amount by which the tones in the image are amplified at the point of capture. A low ISO setting means less light amplification, producing very clean images but needing longer shutter speeds or wider apertures as a result, whilst a high ISO means the image is highly amplified. The practical upshot of this is that you can simulate an increase in the 'gain' of your sensor to give you the option of shorter shutter speeds, and smaller apertures, at the expense of a greater amount of noise in the image.

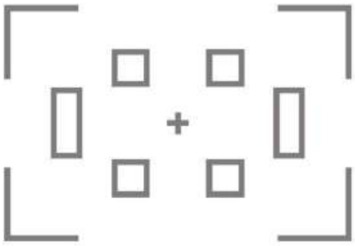
Let's consider an example. With your camera set to automatic exposure point it at a scene and take a light reading. For the sake of argument, say the light meter sets an aperture of f8 and 1/200th of a second. You can produce the same exposure by increasing the aperture by one stop to f5.6 and halving the shutter speed to 1/400th of a second, because this lets the same amount of light through to the sensor. Similarly, reducing the aperture to f11 and setting the shutter speed to 1/100th of a second will also produce the same exposure.

However by altering one setting without altering the other you will change the exposure. In our example, changing the aperture to f5.6 but leaving the shutter speed at 1/200th of a second will increase the exposure by one stop, or one exposure value (EV), making the picture brighter. Decreasing the aperture to f11 will reduce the exposure by one EV, making the picture darker.

Similarly, changing the shutter speed while leaving the aperture alone will also change the exposure. Double the shutter speed to 1/400th at f8 and you reduce the exposure by one stop, halve the speed to 1/100th and you increase the exposure by one stop.

Once you grasp the concept that all these factors are linked and that one will always affect the other, you are well on your way to understanding exposure and how to get more creative control of your images. ■

Be the master of metering



Know when to use the different types of metering modes

Nearly all digital cameras, from top-of-the-range DSLRs to the humblest budget point-and-shoot compacts, have multiple light metering options. Knowing how and when to use these different metering modes can make a dramatic difference to the quality of your photography; unfortunately most people don't understand what the different modes are for, how they work, or how to use them.

Know your modes

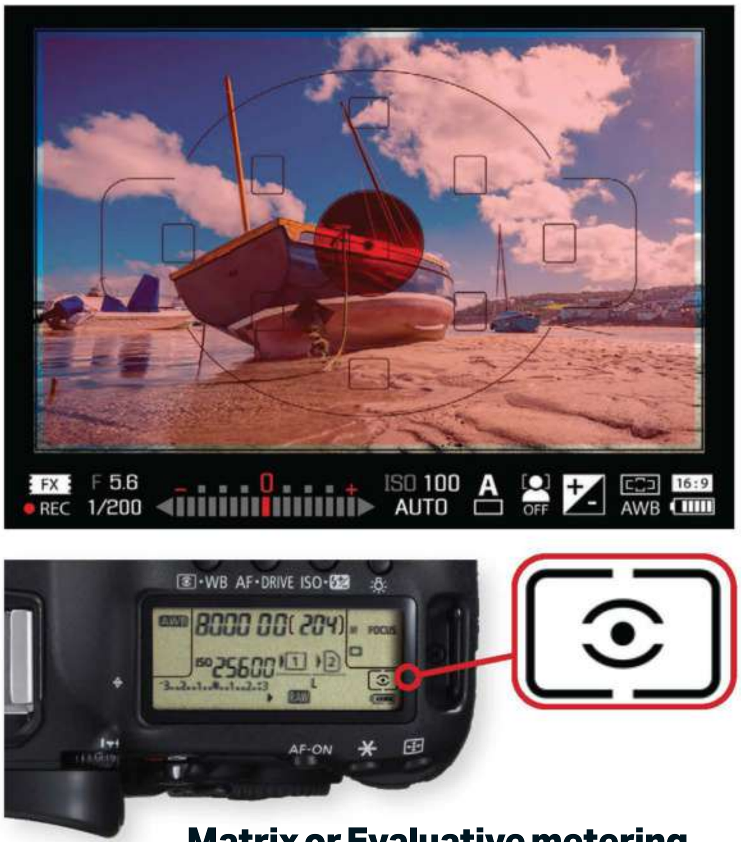
Depending on your camera, you'll find metering options either in the menu or with their own separate control. In cameras with a fully-automatic setting, this will usually disable the metering options; automatically selecting multi-zone metering as the best option for day-to-day scenes and snapshots. The most common light metering modes are found on nearly all digital cameras. They are spot metering, centre-weighted metering and matrix metering. The symbols used for these modes are just about universal. Multi-zone metering is shown by a rectangle filled with a centre spot surrounded by a pattern of shapes; centre-weighted metering is usually shown as a centre spot with shapes above and below it; whilst spot metering is usually a rectangle with just a centre spot.

What they do

Matrix metering, also known as Evaluative metering, is usually the default setting and it is a great multi-purpose metering mode for evenly lit scenes and places emphasis around the AF point used while applying appropriate exposure compensation. Centre-weighted behaves a lot like Matrix metering but it place more emphasis on the centre of the image and doesn't take the AF point into consideration. Spot metering is the most accurate by metering the scene over a very small circular area. Partial metering takes the precision of spot metering and expands the size of the circle used to measure the light. ■

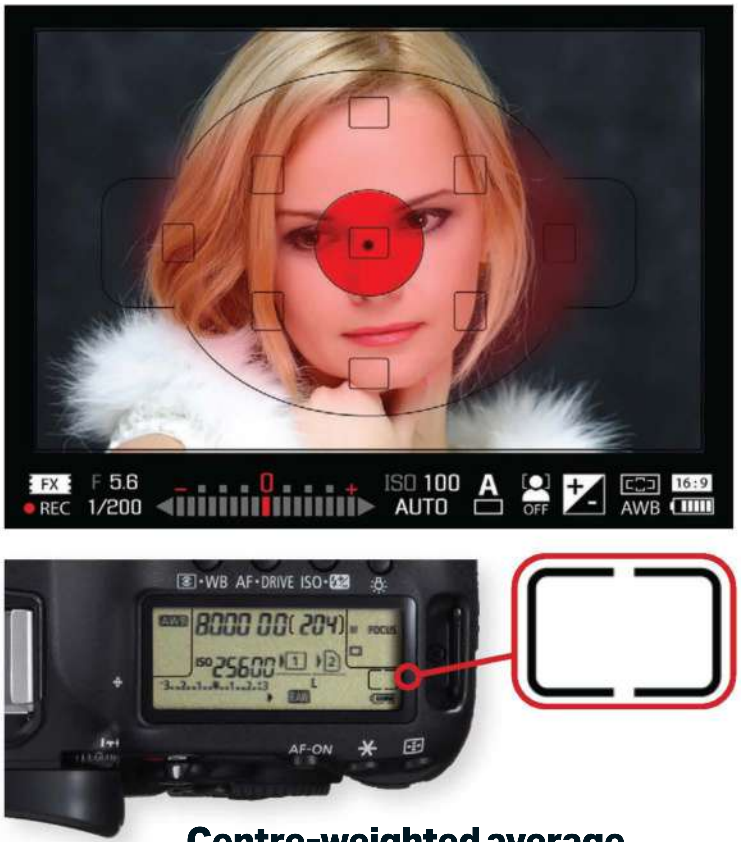
Getting your exposure correct at the time of shooting means that you are retaining more detail in the file; this can be enhanced when it comes to post-processing.

> "Knowing how and when to use these different metering modes can make a dramatic difference to the quality of your photography..."


FX
REC
F 5.6
1/200
0
ISO 100
AUTO
A
OFF
AWB
16:9
WB AF·DRIVE ISO
8000 00(204)
FOCUS
25600
AF-ON

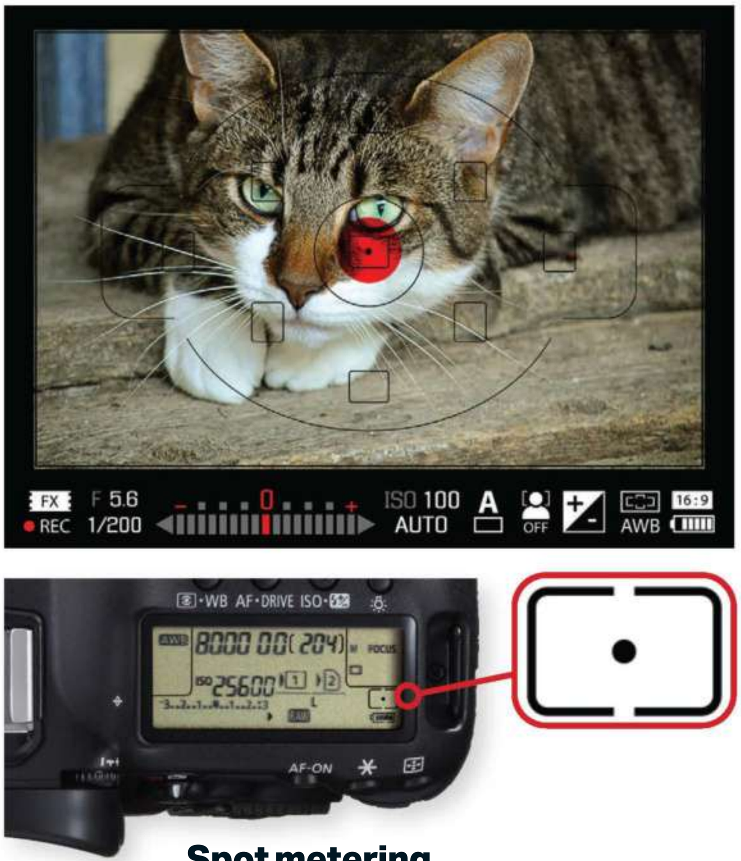
Matrix or Evaluative metering

This mode is great for evenly lit scenes where there are not a lot of tonal variations. It meters the whole scene and is usually the default metering mode on a camera.


FX
REC
F 5.6
1/200
0
ISO 100
AUTO
A
OFF
AWB
16:9
WB AF·DRIVE ISO
8000 00(204)
FOCUS
25600
AF-ON

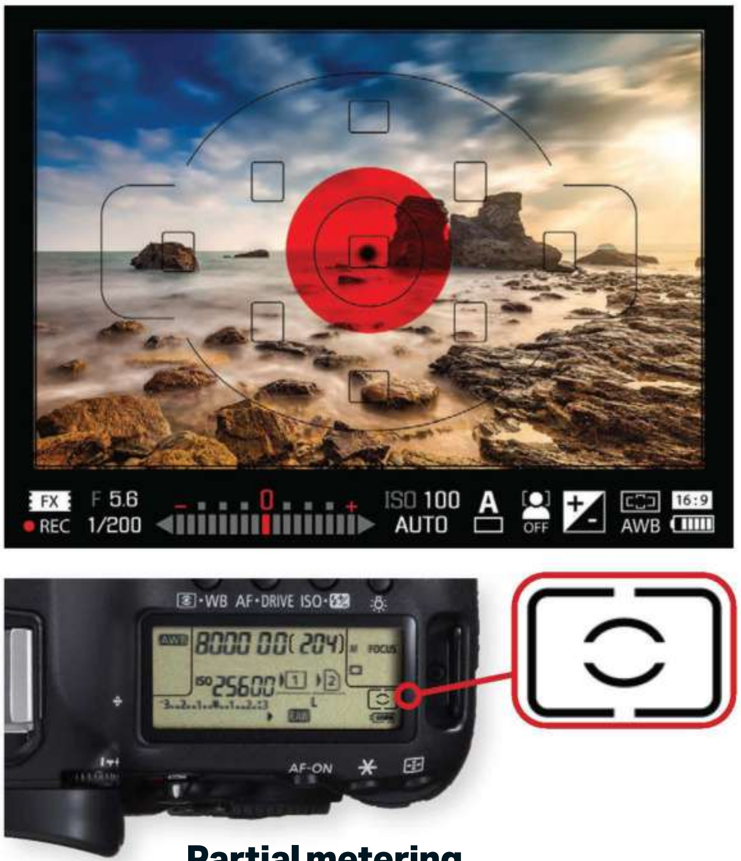
Centre-weighted average

Since this mode concentrates on the central portion of the frame, it makes it perfect for portraits and head shots. Details around the edge of the frame are not metered.


FX
REC
F 5.6
1/200
0
ISO 100
AUTO
A
OFF
AWB
16:9
WB AF·DRIVE ISO
8000 00(204)
FOCUS
25600
AF-ON

Spot metering

When shooting scenes with large tonal variation, spot metering allows you to pick exactly which part of the scene you want to accurately meter for.


FX
REC
F 5.6
1/200
0
ISO 100
AUTO
A
OFF
AWB
16:9
WB AF·DRIVE ISO
8000 00(204)
FOCUS
25600
AF-ON

Partial metering

Essentially, partial metering is an expanded version of the spot metering mode. This makes it easier to use although the metering is not quite as precise as the spot meter mode.

The exposure triangle

The holy trinity for photographers

If you are keen to express your creativity and learn more about the nature of photography, then you will need to be daring and take your camera out of fully automatic mode and explore the skills required for shooting in manual mode. When you shoot fully manual, you have to be aware of the interplay between each of your camera's main settings of ISO, Aperture and Shutter Speed.

Connect them up

The exposure triangle is a popular visual method to connect the three main variables of aperture, shutter speed and ISO amplification that govern the final look of your image. Photography is a balancing act of these three elements when you capture an image. Once you have your camera ready and have a set of variables in place to give you a balanced shot, as soon as you adjust one of the three, at least one of the others has to be adjusted as well, in order to maintain the desired effect you are after in the shot. You are not only altering the exposure but also the quality and appearance of the image.

An example

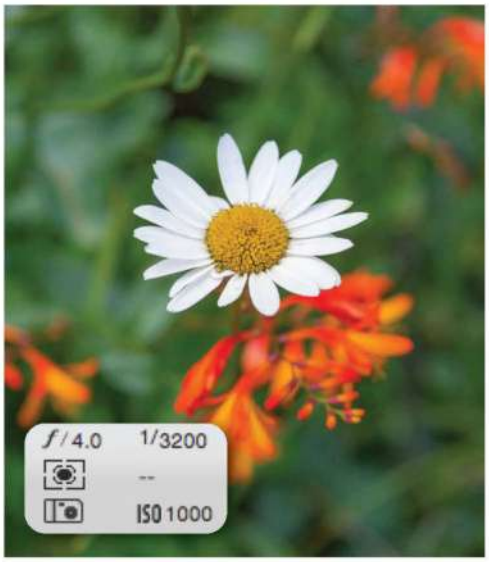
We'll try and sum it up in a theoretical example. If you are shooting a subject such as a flower in a shaded wood, with your camera in manual mode (this is important to keep in mind), you will need to balance your ISO, aperture and shutter speed to give you a well exposed image. The parameters you choose are down to your personal choice of course. In our theoretical example the settings were as follows: ISO 1000, aperture f/4 and shutter speed 1/3200 of a second (this was to keep the flower's motion frozen as it was a windy day), all well and good.

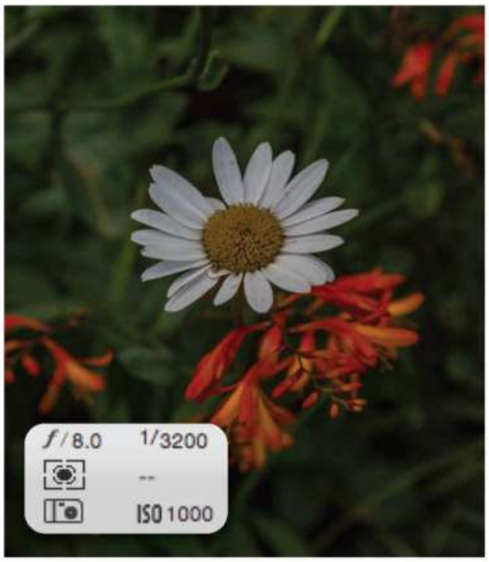
Canon
ISO
DRIVE
AF
2500

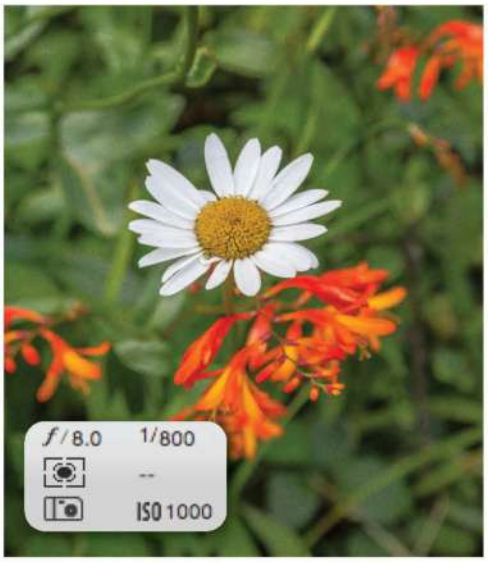
> "... be daring and take your camera out of fully automatic mode and explore the skills required for shooting in manual mode."

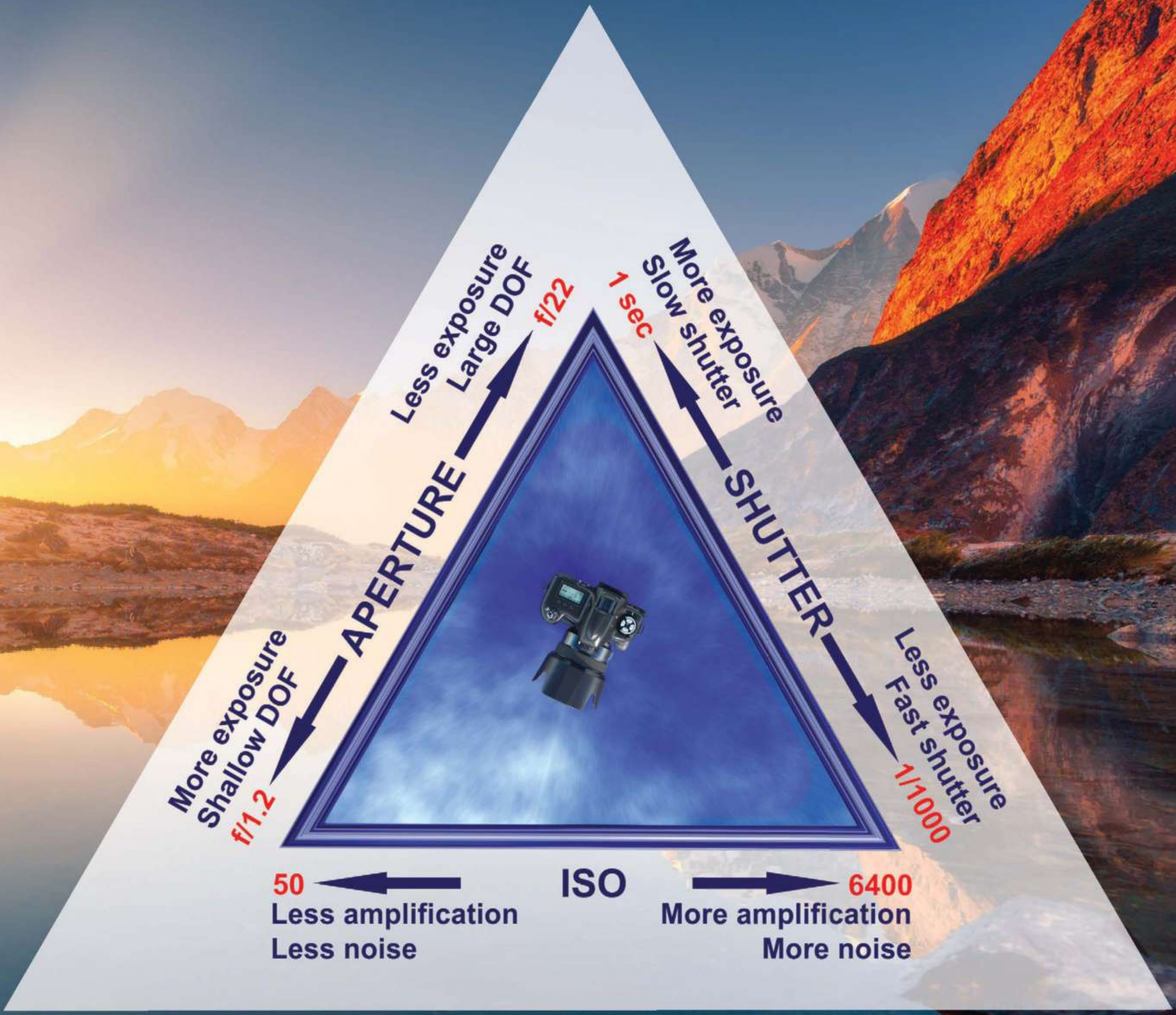
Making changes

If you decide however, that you need greater depth of field, you might change your camera's aperture to f/8, making the diameter of the aperture smaller, blocking more light but increasing depth of field. If you take the shot now, your image will have more depth of field but it will be very underexposed. What happened? Now that you are in manual mode, you have currently altered only one side of the exposure triangle. You would need to alter at least one of the other two in order to bring your image back to its proper exposure. You decide to keep the ISO at 1000, so the shutter speed will have to alter. If you increase the duration that the shutter is open, you can allow the camera to gather light for an extended period of time. In this case, because we changed from f/4 to f/8, which is 2-stops, we need to allow for 2-stops more light gathering from the shutter speed we use. 1/3200 of a second would need to become 1/800 of a second to allow for the 2-stop alteration you made to the aperture with the ISO remaining unchanged. A basic rule of thumb to keep in your mind is that a 1-stop alteration is equal to either a halving or doubling of a particular parameter. In this case the 2-stop alteration to our theoretical shutter duration means 1/3200 of a second slows to 1/1600 and then slows a second time to 1/800. ■



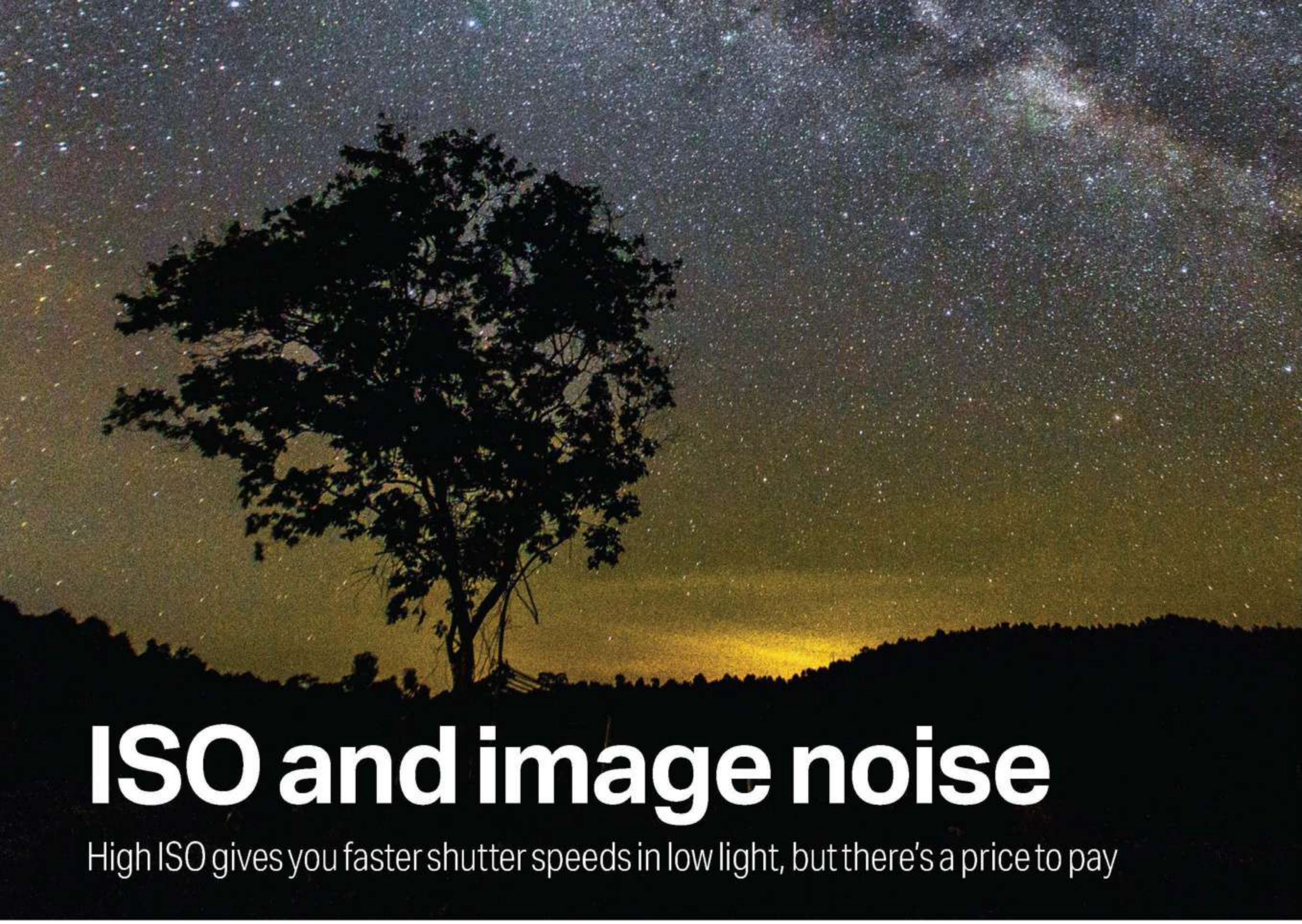





Less exposure
Large DOF
f/22
APERTURE
More exposure
Shallow DOF
f/1.2
More exposure
Slow shutter
1 sec
SHUTTER
Less exposure
Fast shutter
1/1000
50
Less amplification
Less noise
ISO
6400
More amplification
More noise

A word about ISO

Although ISO is included as part of the exposure triangle, it is worth noting that on digital cameras, higher ISO settings amplify the amount of light recorded in a scene depending on the ISO value you use. ISO is often referred to as the sensitivity of the sensor to light, but it is more accurate to understand that it is light/image amplification, rather than sensor sensitivity. Back in the days of film, if you used a film stock of ISO200 for example, you set your camera's ISO to match. From then on, only the other camera settings of shutter speed and aperture were used to get the correct exposure you wanted, as well as supplemental lighting if needed. The ISO value always had to remain at 200. These days, changing the ISO value only simulates different light sensitivities. ■



ISO and image noise

High ISO gives you faster shutter speeds in low light, but there's a price to pay

Anyone who has owned a digital camera for a while will be familiar with the concept of image noise. It's that grainy distortion that spoils pictures shot in low light conditions with high ISO settings. What is image noise, where does it come from and what can be done to prevent it?

All electronic devices generate noise. The background hiss of a radio, the sound of an over-amplified electric guitar, or the interference on a badly tuned television, all of these things are electronic noise, and so is the noise seen in a digital photograph.

This noise comes from a variety of sources. Some of it is generated by imperfections in the electronic components, or as a by-product of their normal operation. For instance, capacitors generate a small amount of noise as they charge and discharge. Electronic components can also be affected by environmental noise, such as the electrical fields that constantly surround us.

Circuit noise can be minimised by superior manufacturing and rigorous quality control. Unfortunately some cheaper camera brands, or even budget models from better-known brands, may use components of lower quality, which is why these types of camera generally produce noisier images than the more expensive models.

This is the main circuit board from a Canon EOS 5D MkIV digital SLR, showing the powerful DIGIC6 and DIGIC 6+ image processing chips.

Sensor noise

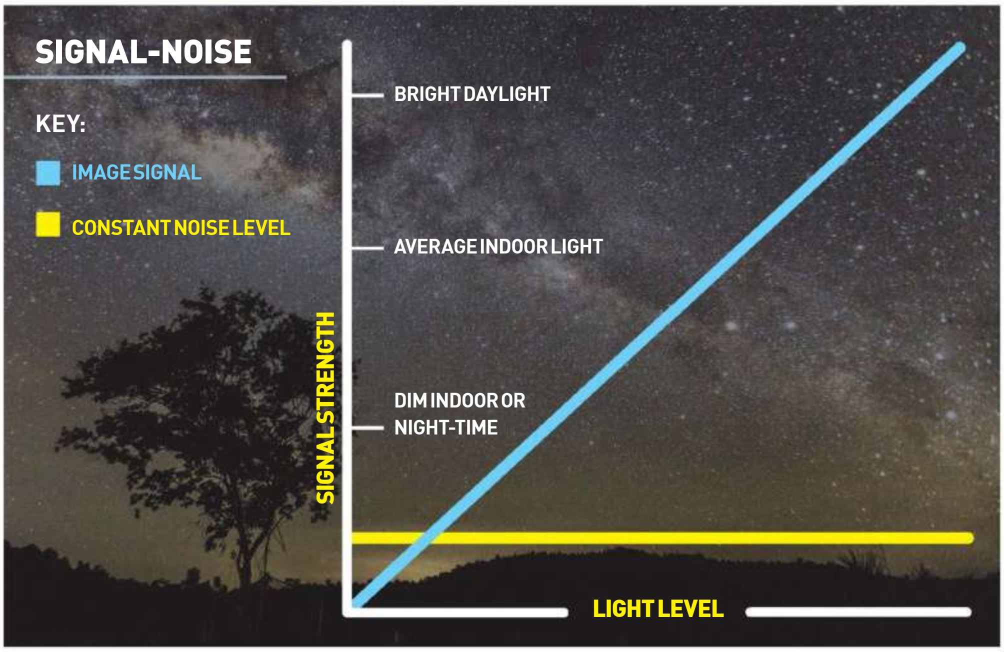
The other main source of image noise is the sensor itself, and in most cases this is unavoidable. The individual photocells on a digital camera sensor are incredibly small, especially with high-resolution compact camera sensors.

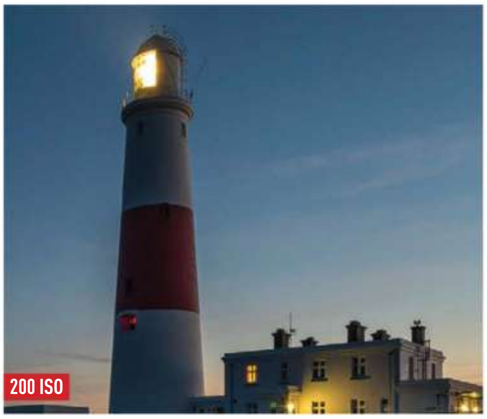
Most compact camera sensors have over 10 million individual photocells crammed into an area of less than 30 square millimetres. These photocells are so small that in low light conditions they may only be collecting a few thousand photons (individual light 'particles') during an exposure, so the level of the electrical signal produced by the cell can be affected by random statistical fluctuations in photon density. This is the main reason that physically larger sensors are much better than smaller ones. The individual photocells are larger and collect proportionately more light during the exposure producing an inherently higher signal to noise ratio.

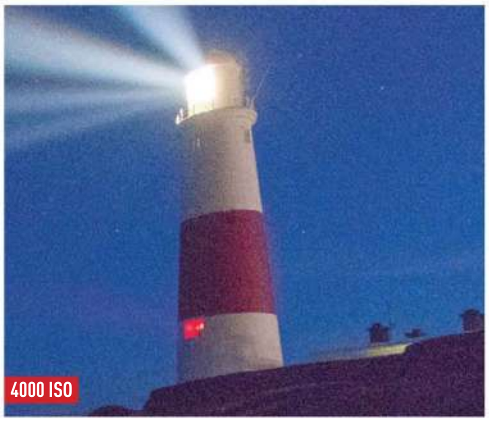
Approx. 1/10th of a millimetre

Actual microscope photograph of the surface of a Canon CCD, showing the Bayer mask filter and microlenses

The level of noise produced by the sensor and other components in the camera is usually constant and at a fairly low level. When taking photographs in good light the level of the signal vastly outweighs the level of noise; in other words the signal to noise ratio is very high, and consequently noise isn't a problem. The





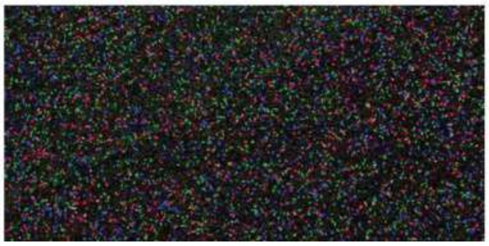


> *"A higher sensitivity increases the amount by which the signals from the sensor are amplified… unfortunately the noise gets amplified as well."*

problems start when shooting in low light, as the level of the signal drops nearer to the constant noise level, producing a lower signal to noise ratio. At extremely low light levels the signal may be entirely drowned out by the noise.

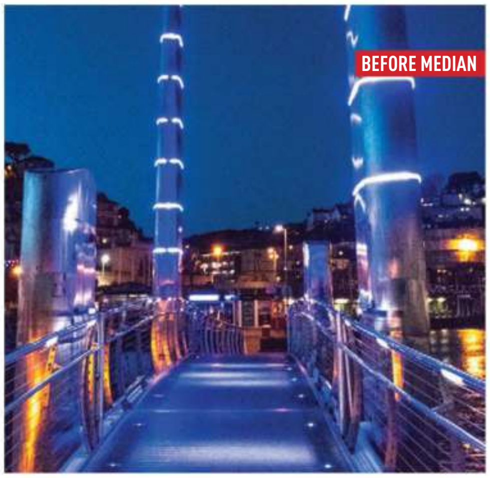
This problem is made worse when shooting at higher ISO settings. When we set a higher sensitivity we are increasing the amount by which the signals from the sensor are amplified, and unfortunately the noise gets amplified as well. If the signal to noise ratio was already very low then this just produces more noise without improving the image. This is why high ISO images are always more noisy than ones taken at lower settings.

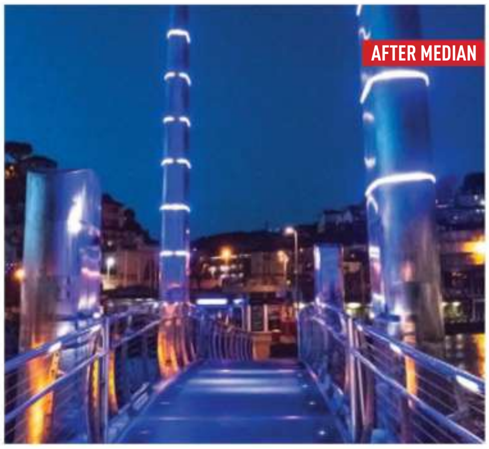
Another type of sensor noise can also be a problem when using exposures longer than a couple of seconds. Sometimes the photocells that make up the sensor may not all respond to light to an equal degree, causing single pixels to appear very bright or very dark. The charge build-up over a longer exposure makes this problem more noticeable. Since the pattern of these "dead" or "hot" pixels is usually consistent from one frame to the next this type of noise is remedied by applying a filter during image processing. Most modern cameras do this automatically but it can be a problem on older models. Images taken on older cameras can show a lot of "hot" pixels, especially during long exposure photographs with no long exposure noise reduction. Below is an example of how bad it can get.



Noise reduction

Cameras reduce image noise by using smoothing filters during image processing. The most commonly used is called a Median filter. This works by comparing each pixel to the ones surrounding it, and if it has a brightness that is different from its neighbours then it is replaced by a new pixel with the average value of the nearby pixels. This eliminates noise effects, but also reduces detail and contrast. Compare these next two images. The first is unfiltered, the second has had a median filter applied. The second image is "cleaner", but as you can see the level of detail has been greatly reduced.





Another type of noise reduction is called "pixel binning", although this is less widely used in recent digital cameras. In this process, the signals from groups of four, nine or even 16 adjacent photocells are grouped together into a "super pixel". This has the effect of increasing the signal to noise ratio, but of course it also reduces the effective resolution of the image. It increases the signal to noise ratio, but it also reduces the quality of the image.

The only effective remedy to image noise is to use larger, more sensitive photocells. Digital SLRs have a major advantage in this area, since they have physically larger sensors. Compact camera sensor technology continues to improve, both in image processing and sensor design. We will undoubtedly see further advances in the future, but for now image noise is something we just have to accept. ■

White balance

White may not be as white as you think

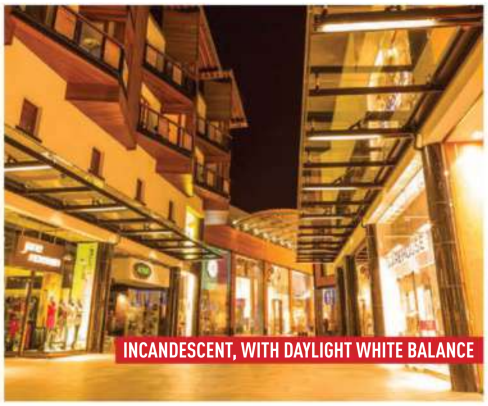
When you look at, for example, a sheet of white paper, your brain adjusts what you see so that it matches what you are expecting to see. However your digital camera doesn't have any expectations, and the colour that it "sees" is the actual colour present in the scene.

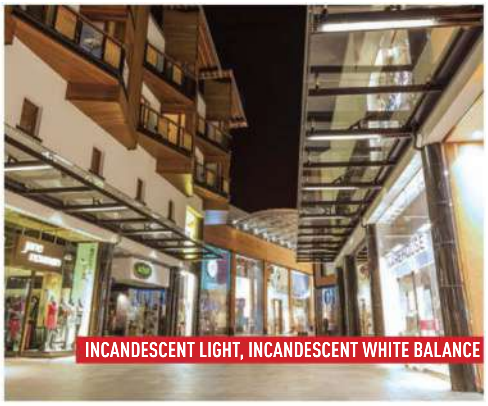
'White' light visible to humans can actually vary in colour from reddish orange to greenish-blue. This variation is usually described as a temperature range, with warm being the red end and cold at the blue end, and is usually measured in degrees Kelvin using a colour meter. Confusingly, the higher the colour temperature, the cooler the tone and vice versa.

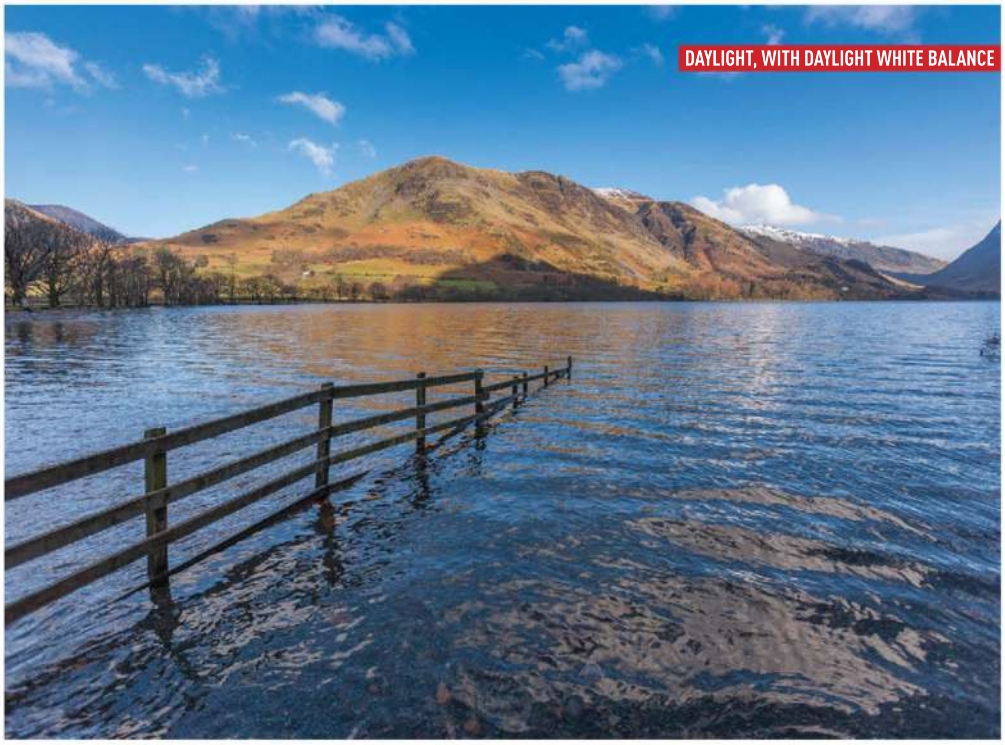
We perceive various shades of white light illuminating a scene as neutral, a clever trick performed by our brains to maintain a sense of normality. Digital cameras can perform the same trick using a feature called automatic white balance. The camera evaluates the scene through the lens, analysing areas it guesses should be white (highlights) and black (shadows). More expensive cameras have a more reliable ambient white balance sensor that measures the temperature of general, focused light. However these automatic systems can be fooled, so most cameras give you the option of setting the white balance manually, either from pre-sets that cover most normal lighting conditions or by making an accurate measurement of the prevailing lighting conditions.

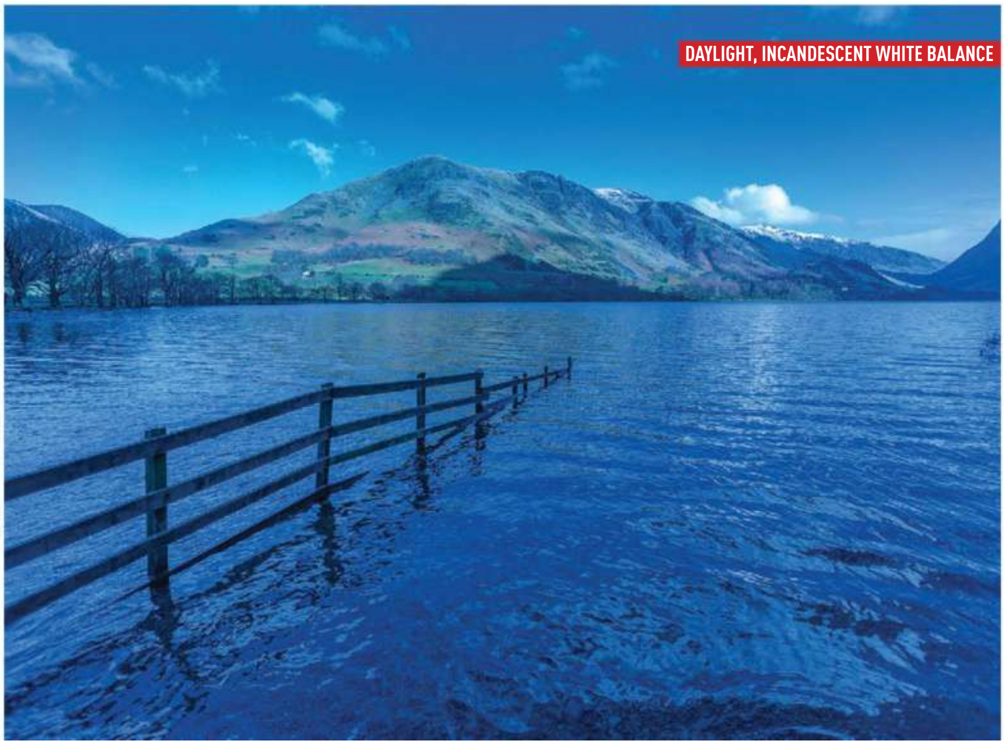
> *"We perceive various shades of white light illuminating a scene as neutral, a trick performed by our brains to maintain a sense of normality."*

In the example pictures on this page you'll see an image with ordinary incandescent light bulbs, also called tungsten lighting. As you can see, when the camera is set to the warm artificial light


INCANDESCENT, WITH DAYLIGHT WHITE BALANCE


INCANDESCENT LIGHT, INCANDESCENT WHITE BALANCE


DAYLIGHT, WITH DAYLIGHT WHITE BALANCE


DAYLIGHT, INCANDESCENT WHITE BALANCE

white balance setting that suits this lighting, the light areas of the scene are neutral. The same scene looks very different when the camera's white balance is set to normal daylight colour temperature. Now there is a distinct reddish-orange cast. Light bulbs can shine with various colour temperatures. Cheap traditional, low wattage light bulbs tend to be the warmest in colour, while low voltage halogen bulbs are cooler in tone.

Another example is a typical noon day outdoor scene where the ambient white light temperature is cool. When the camera's white balance setting matches the cool tone of the brightness of the sun, everything looks quite normal. On the other hand, if the camera has been set for tungsten artificial light, the scene appears to have a very blue cast. Sunlight, like artificial light, can vary quite considerably in colour temperature. Early morning and late afternoon daylight is warmer as cooler components of the light are filtered out because it has to shine through more atmosphere and its pollutants as the sun is nearer the horizon. Meanwhile, cloudy and overcast conditions deliver a cooler light because warmer components are filtered out by the cloud.

Our third example is lit with fluorescent lighting, and presents an even harder challenge for your digital camera. The visible spectrum of fluorescent light is not a nice smooth line, it's full of peaks and troughs. Some fluorescent lights have a green cast and others a pink cast. These differences are visibly evident where strip lights of different tone have been fitted side by side. So-called daylight tone fluorescent lights are not equivalent to real daylight. Better digital cameras will have a number of presets for fluorescent light to help you match the white balance in these conditions more accurately. In our example here, the fluorescent light is a greenish yellow in tone.

Know your camera

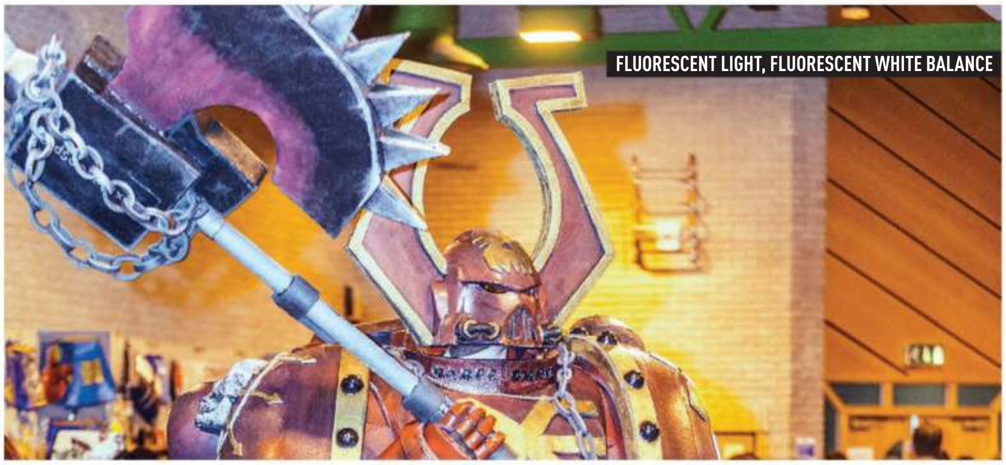
Nearly all digital cameras offer white balance adjustments accessible either from a settings menu or, typically on higher spec cameras, via an external button in conjunction with an LCD display.

Manual white balance

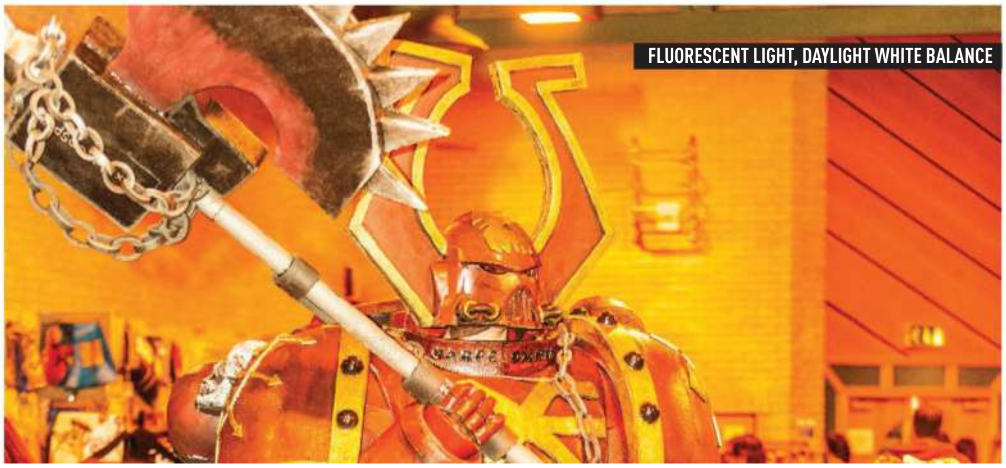
Some cameras can let you calibrate the white balance setting manually. You simply hold a white card in front of the camera lens and press a white balance calibration button. The camera adjusts its white balance setting until the card is reproduced neutrally. Beware of this setting remaining on as when you return to normal shooting conditions it may spoil your pictures!

Preset white balance

All digital cameras offer a choice of white balance presets, and some cameras let you choose the setting via colour temperature values. Some really advanced cameras let you bracket white balance settings, or take a series of shots with settings above and below your standard setting. ■



FLUORESCENT LIGHT, FLUORESCENT WHITE BALANCE



FLUORESCENT LIGHT, DAYLIGHT WHITE BALANCE

TYPICAL WHITE BALANCE VALUES

TUNGSTEN/ARTIFICIAL

2500-3000K

Indoor lighting using traditional non-fluorescent light bulbs.

FLUORESCENT

3500-5500K

Include strip lighting and modern compact fluorescent lamps

NORMAL DAYLIGHT

5500-6000K

Typical mid-morning to mid-afternoon conditions at sea level.

CLOUDY/OVERCAST

6000-8000K

Hazy or overcast conditions.

CLEAR BLUE SKY

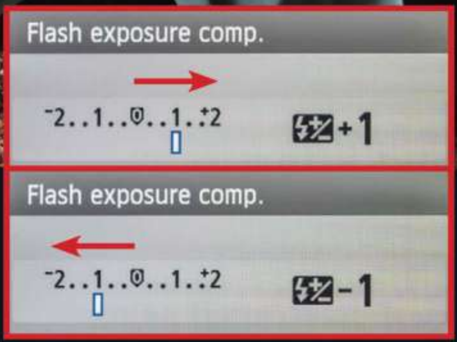
10,000-15,000K

Exceptionally clear mid-summer or high altitude conditions, especially snow scenes.

Light it up with flash

Some quick tips on using your camera's flash

Flash exposure compensation (FEC) allows you to increase or decrease the power output of your flash. Most cameras allow 2 stops of adjustment in both directions.



Flash exposure comp.

-2..1..0..1..+2 +1

Flash exposure comp.

-2..1..0..1..+2 -1

It is a fair bet that your camera has a pop up flash. This is a small flash unit that sits on the top of your camera and, if you are using it in automatic mode, you may have encountered situations where it has suddenly popped up as you were about to take a photo. This tiny flash draws its power from your camera's battery and as such it has limited power and range so as not to totally drain your battery. A pop up flash usually has a range of about .5m up to 5m. Anything further out and you will not be able to light your subject properly as you won't have the range or power.

Full disclosure

Let's be honest at the outset and say that the pop up flash should be used as a last resort only. That tiny light source will give your photos a harsh look with sharp, dark shadows cast directly behind them. They often tend to overexpose the subject too and give them bleached out faces and although there are systems that can reduce it, you run the risk of getting red-eye in your subjects since the flash is normally directly at eye level. Small light sources create hard edged shadows and there's not much you can do to offset this.

Compensate

Since your camera may not always choose the most optimal power for the flash, you have the option to either increase or decrease the power output yourself, in order to get a better exposed shot. It is referred to as flash exposure compensation (FEC) and it lets you reduce the power if it is overexposing the shot or increasing it if the shot is too dark. You can usually find the FEC button on the camera, it is a small button with a lightning bolt icon next to a +/- symbol. If not, you can find it in your camera's menu system under flash control. You can normally adjust the flash by 2 stops in either direction in order to fine tune the power output.

Fill flash

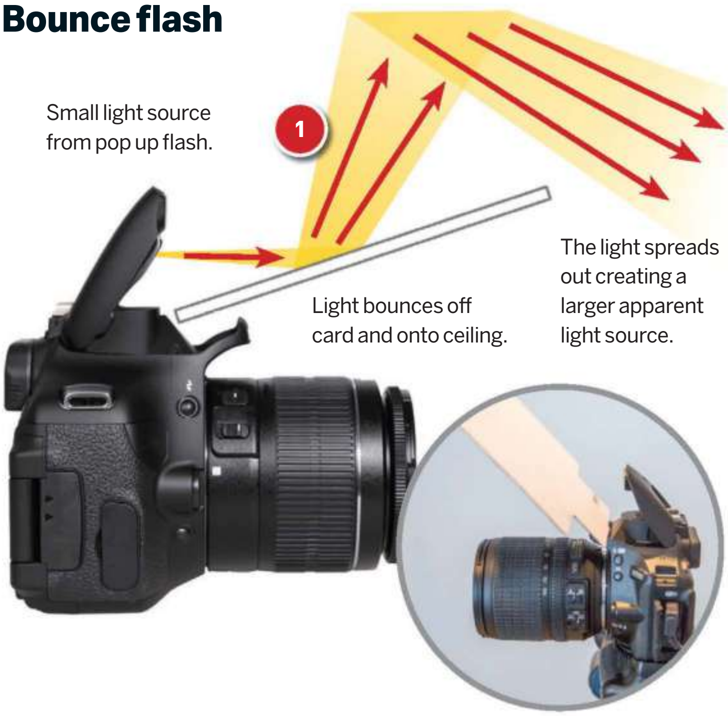
One area where the pop up flash can be quite useful is during daylight hours oddly enough. If you have a subject who is either backlit by strong light or has dark shadows on their face, you can use the pop up flash to add a fill light that reduces the depth of those shadows and gives a much better exposure. You can use the FEC setting to dial up the flash power if needed or reduce its power so it is affecting just the shadows and not bleaching your subject's face out.

What about those shadows?

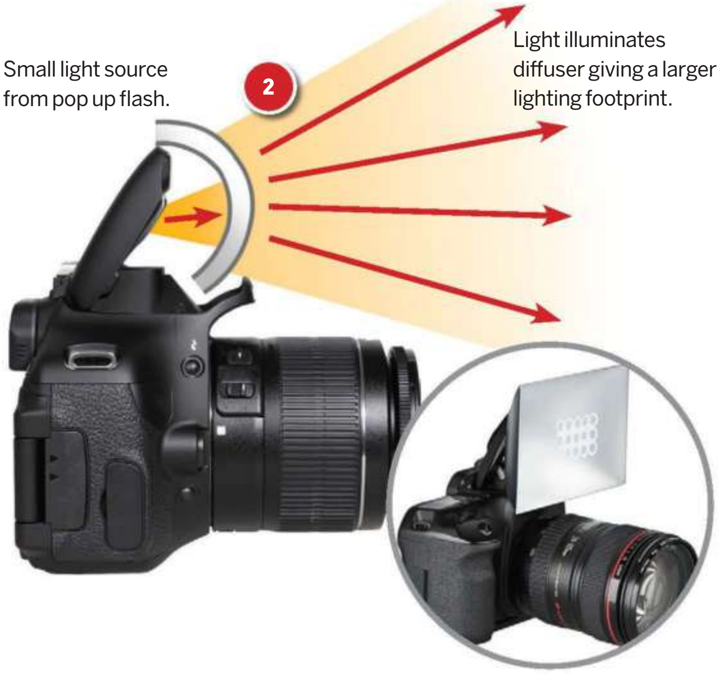
A lot of photographers have quite an aversion to the pop up flash. They would much prefer to use an external flash mounted to the hot-shoe attachment of the camera. An external flash has the ability to rotate and angle its flash head, so you can achieve different effects that are not possible with the pop up since it is fixed in one position on the camera. With an external flash you can bounce the light off

Some flash basics for better lighting

Bounce flash



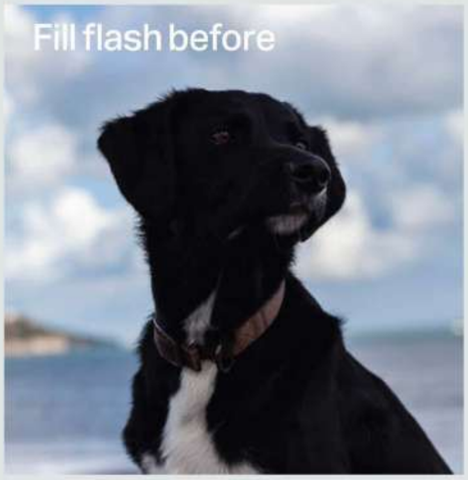
Diffused flash

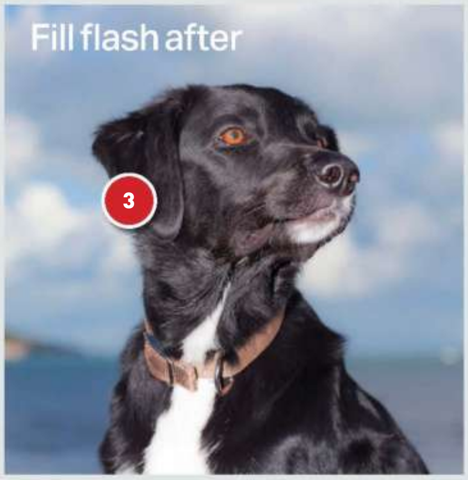


1. BOUNCE FLASH, as the name implies, is a method used to divert the light coming from the flash head upwards onto a ceiling using a piece of white card; as it bounces off the card and onto the ceiling, the patch of illumination becomes larger. A larger light source creates softer shadows and you will need more power since the light has to travel much further than before.

2. DIFFUSED FLASH uses a piece of translucent material in front of the flash head. The larger the material, the better, since you are trying to make the tiny pop up flash unit's light source larger by illuminating the diffuser, which in turn illuminates your subject. You will need more power as some of the light output will be blocked by the diffuser material.

3. FILL FLASH requires a deft touch in order not to overdo it. If you are photographing a back lit or shadowed subject, you need to use camera settings that deliver a normal exposure for the background, with enough power from the flash to eliminate dark shadows from your subject.


Fill flash before


Fill flash after

> *"You can normally adjust the flash by 2 stops in either direction in order to fine tune the power output."*

a wall or ceiling to increase the size of the light that hits your subject. A larger light source creates more diffused light that in turn gives you softer, less harsh shadows. The downside is that external flashes can be expensive and you may not be ready to step up to external lighting systems yet.

Some options

Despite your pop up flash being in a fixed position, you can try a couple of techniques to alter the path of the light. As an example, if you are shooting a portrait indoors, take a sheet of white card or paper and hold it in front of the flash at an angle so the light from the unit is deflected upwards and bounces off the ceiling. Since the light has had to travel further it is now much weaker, so you will need to dial in more FEC power to correctly light your subject. You will need to experiment with flash power and the angle of the card in order to fine tune the technique. This is by no means a perfect solution but it is definitely worth a go.

A diffuser

Yet another option for using softer direct flash is to use a diffuser. Diffusing material is usually a semi transparent white fabric, through which light can pass. In so doing, the light is scattered and softens the light of the flash. The size of the material also creates a larger source of light which helps take the edge of the harsh shadows you're used to. Just like the bounce flash option, the power of the output is diminished by passing through the material, so you will need to use FEC again to add extra power to the flash. Remember that you will need to be working at close range to your subject to make the most of the small amount of power at your disposal.

Use it well

The pop up flash does get a bit of a bad rap and it is not an ideal solution for better photos. However, with a little bit of experimentation and some cheap materials, you can at least improve the output you get from it a little. It's not the same as using dedicated off-camera flash units and big diffusers and soft boxes, but it is a place to start. ■

Mastering exterior lighting conditions

Be the master of good exposure with our handy guide

> "If you love to shoot landscapes, but often find that the exposures never seem to give the results you expect, don't worry."

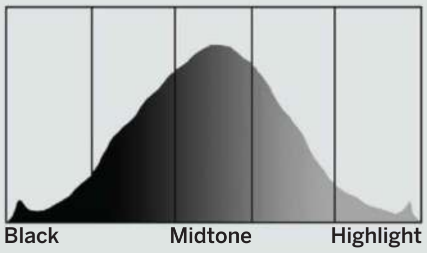
For many, stepping out from behind their cameraphone and shooting with a DSLR, can be a big deal. Make no mistake, cameraphones are amazing, for what they are, but for us, there is nothing to match working with a DSLR and getting immersed in the process of attaining the best exposure of your subject. If you love to shoot landscapes, but often find that the exposures never seem to give the results you expect, don't worry. Landscapes can be a bit tricky to meter correctly and you will often fall prey to the behaviour of the camera's metering system in different lighting conditions. It is very likely that the scene you are photographing will have more tonal range than your camera can capture and therefore fall outside an average metered setting. Here are a few pointers that can help you with various lighting scenarios. ■

Bright, full range

In evaluative metering mode, on a bright sunny day, you may find that the image captured is fairly accurate in its representation of the scene, since there is a full spread of tones from lightest to darkest.

The histogram should show an even spread throughout the midtone range with perhaps some small spikes at the highlights and shadows end.

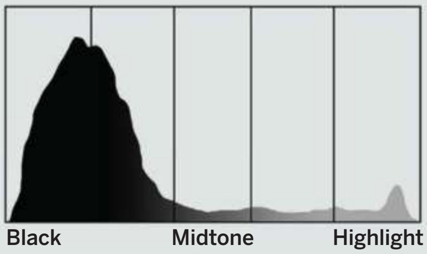
Depending on your creative approach, you may want to dial in a small amount of positive, or negative, exposure compensation.



ISO: Set low
Metering: Evaluative
Exposure Compensation: Only if needed

Dark scene

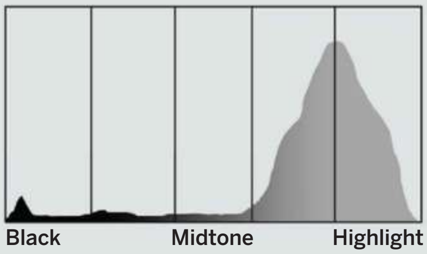
A darker, low-key scene, such as an evening shot near dusk, will be metered in a different way. When a camera's meter averages a scene, it assumes that the average of all the tones will be equivalent to an 18% grey reflectance value. Since a darker scene, by its very nature, is darker than that, the camera will overexpose the scene to achieve that 18% value. You will need to dial in about -1 or -2 stops of negative exposure compensation to get the exposure back down to an acceptable level. Your histogram should show a greater distribution of tones in the shadow areas on the left of the histogram.



ISO: Set low
Metering: Evaluative
Exposure Compensation: -1 or -2 stops

High-key scene

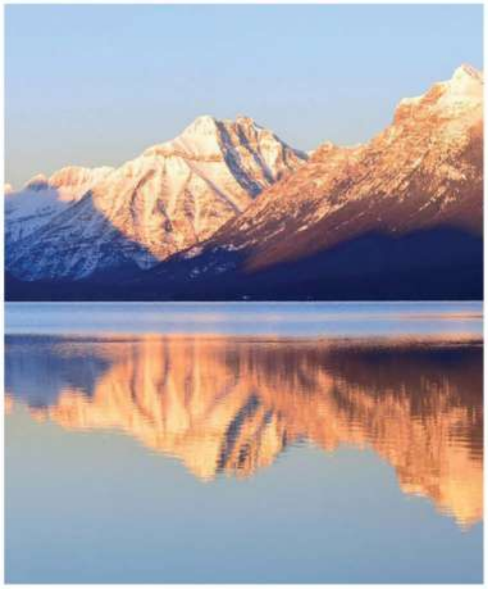
A high-key scene is bright with very little in terms of shadow areas. Winter scenes or bright beach environments are good examples of this. Whereas a dark scene is metered for 18% and overexposed, it stands to reason that very bright scenes will be underexposed, since the camera's meter is now trying to darken the overly bright scene to get it down to 18% reflectance. This can make images look dark and muddy. In this case, you will need to dial in anywhere between 1-3 stops of positive exposure compensation, in order to return the image to full brightness again. Your camera should now show a high distribution of tones in the highlight areas on the right of your histogram.

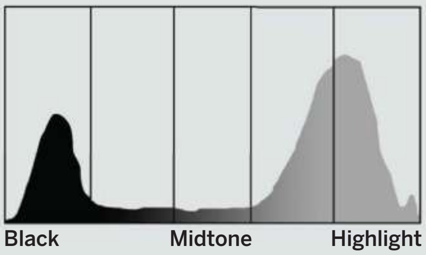


ISO: Set low
Metering: Evaluative
Exposure Compensation: up to +3 stops

High contrast

Scenes of high contrast, such as bright skies with dark foregrounds, can be a little more confusing to the metering system on your camera. Depending on how much the highlights dominate the scene, it may underexpose. If there are far more shadows in the scene, it may overexpose. You can choose to take a test shot and simply adjust your exposure compensation accordingly, or you can use the spot meter and place it on a middle tone area of the scene to get a more accurate metering of that part of the shot.



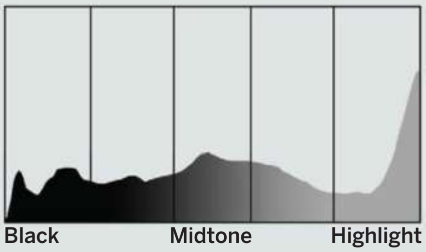


ISO: Set low
Metering: Spot
Exposure Compensation: Check in situ

Backlit, low contrast

Low contrast scenes are characterised by the blend of light and dark areas where there is less in the way of either highlights or shadows. Scenes such as this will probably require you to use spot metering, as you did with the high contrast scene example above.

You can place the spot meter on an area away from the brightest, or darkest, areas of the shot and meter from that. Again, depending on personal preference, you might want to add positive, or negative, exposure compensation, if you feel it is required.



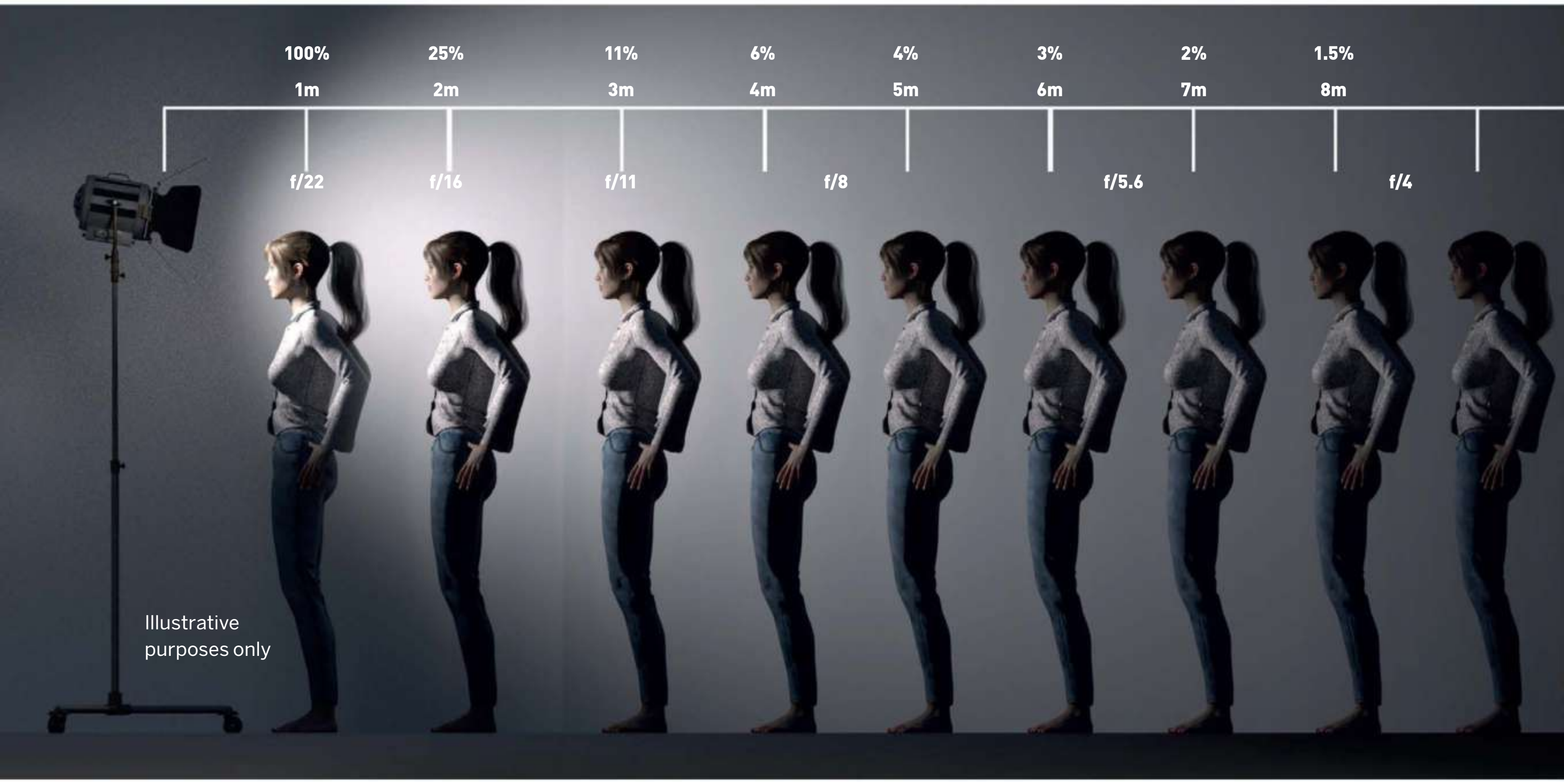
ISO: Set low
Metering: Spot
Exposure Compensation: Check in situ

The inverse-square law

Understand how light and distance work

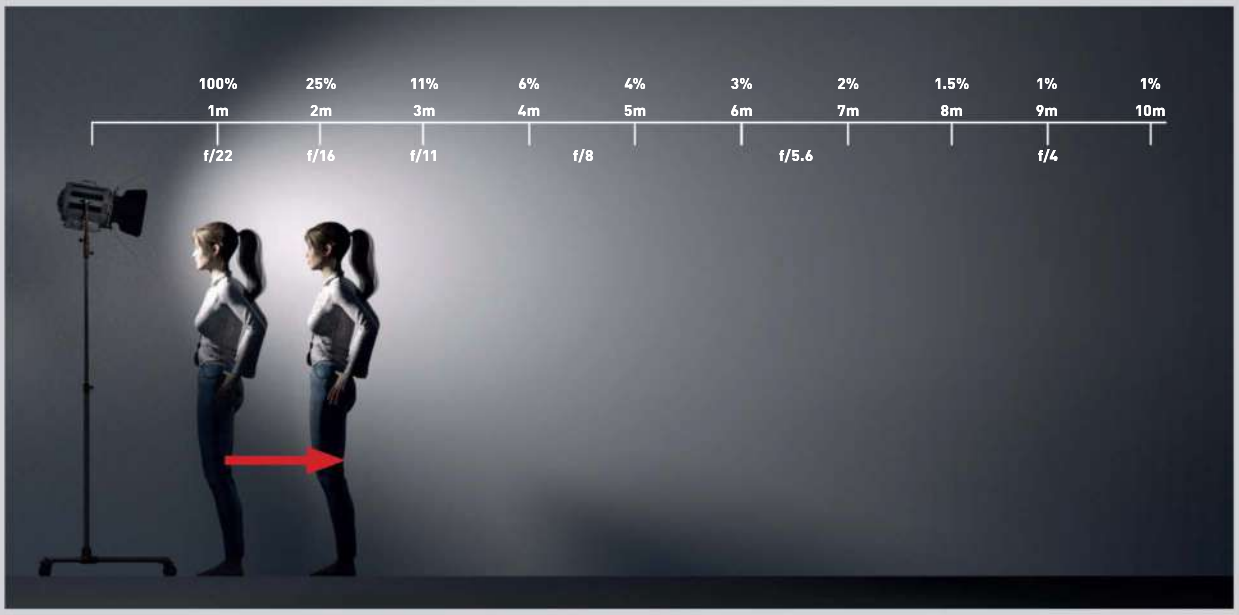
Don't worry, this isn't going to turn into a maths class, or a lecture on physics. It's an old adage that photographers work with light and understanding a little about how light affects your scene is a useful thing to know. In reality, you don't have to be able to carry a headful of fractions and do mental arithmetic, just know that light has some interesting properties as it travels from its source, to your subject. This brings us to the inverse-square law. This law applies not only to light but any physical quantity, but for our purposes it states that the intensity of a light source is inversely proportional to the square of the distance from that light source. Reading that you may be tempted to flip over to the next page, but bear with us.

The actual formula reads: intensity of light = 1/ distance2. So why is that worth worrying about? Those who are new to using light sources such as flashes and studio lights are likely to imagine that if you place a subject next to a light source and take a photo, then move the light twice the distance from the subject and take another shot, the light will be half as powerful. This is not the case because of the way light falls off using the inverse square law. To sum it up we have a diagram that lays out the values and intensities you will encounter as you move your subject away from a light source. We have a theoretical light source set at full power and a subject who starts at 1m away from the light. If you use the formula and take the distance of 1 and square it you get 1 (1 x 1 = 1 so 1/1 intensity). Move your subject to 2m and rather than the intensity being half power the formula tells us otherwise (2 x 2 = 4 so 1/4 intensity). At double the distance from the light source, the intensity is actually 1/4 the brightness or 25 per cent. At 3m (3 x 3 = 9 so 1/9 intensity) it is now 1/9 or 11 per cent (we've rounded up the numbers) and so on. Whilst this is all well and good, how does it help us in the real world? If you look at the percentages, from 1m to 2m, there is a 75 per cent drop in intensity. From 3m to 6m there is only an 8 per cent drop in intensity. Finally, from 6m to 8m - 10m, there is only a 2 per cent drop in intensity. We've added an approximate set of f-stops to show how you would alter your aperture to get a good exposure as the light intensity drops away the further your subject is from the light source. Now we can put all this information together for some lighting examples. ■



Scenario 1

Your subject is very close to the light source. If they happen to move one step away from the light, they will be underexposed by a fair margin and you will have to alter your settings to compensate.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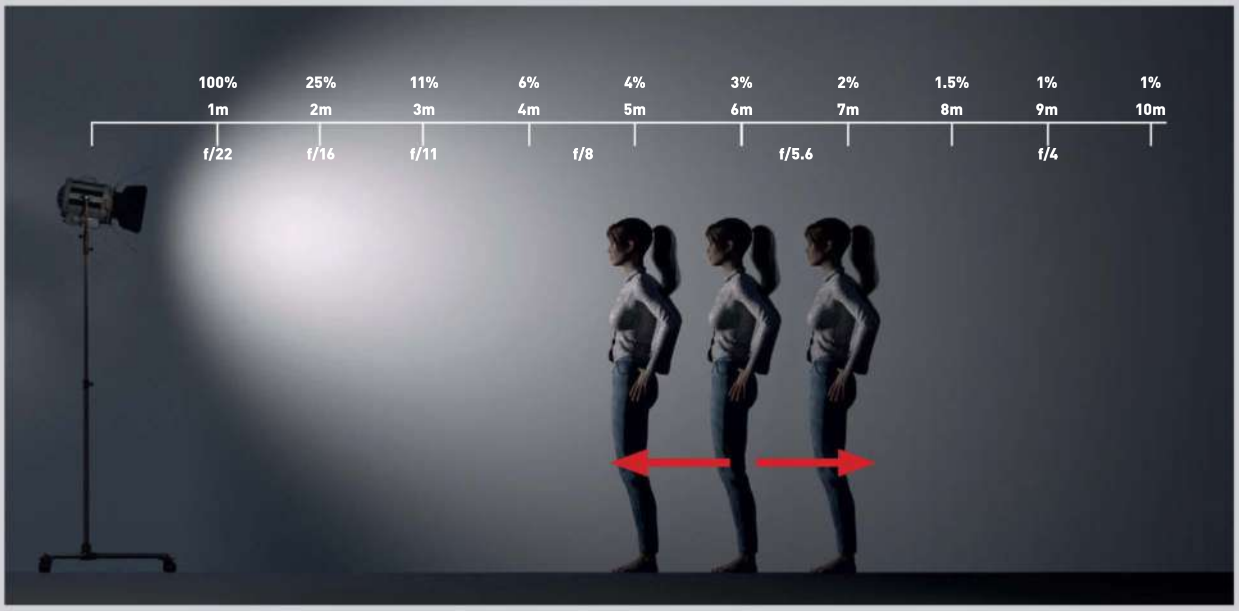
f/22
f/16
f/11
f/8
f/5.6
f/4

Scenario 2

Your subject is much further away from the light source. If they move a step in either direction this time, because of the much smaller fall off in intensity this far out from the light source, you will most likely not have to alter your settings at all.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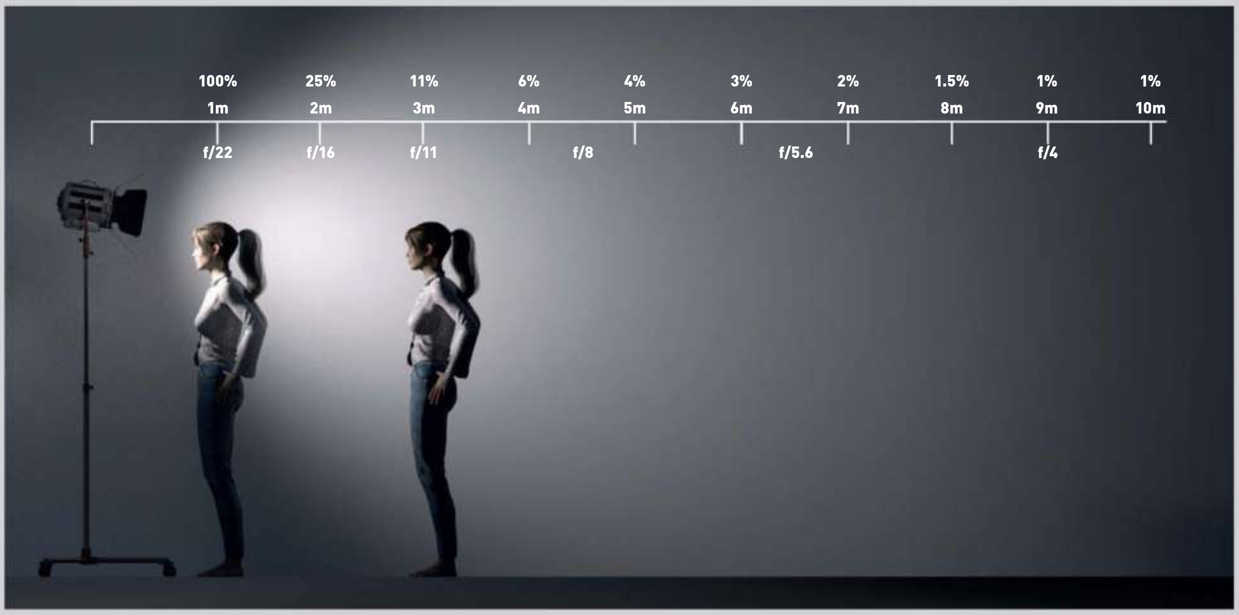
f/5.6
f/4

Scenario 3

You have two subjects a very short distance from your light source, one of which is standing closer to the light than the other. The one further from the light source will be underexposed by a large margin due to the rapid fall off in the first few metres.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IMPROVE YOUR CANON PHOTOGRAPHY

Top tips that can help you take better photos

There are a number of hints and tips we can pass on that can help you evolve as a photographer. Many of those tips cover shooting techniques, others may simply be advice about equipment and understanding a little more about your camera. You don't have to use them all but pick out a few that work for you, develop them and make them a part of your creative photographic process and they will stand you in good stead as you progress your skills. ■

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Get on their level

DIGITAL
CANON ZOOM LENS EF-S 18-55mm 1:3.5-5.6 IS
CANON INC.
Φ58mm
Canon
EOS 550D

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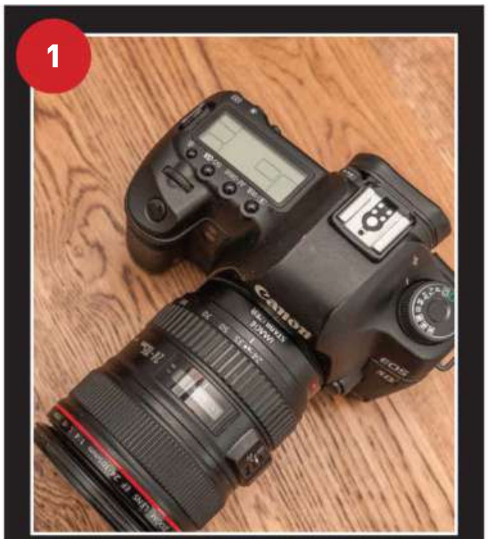
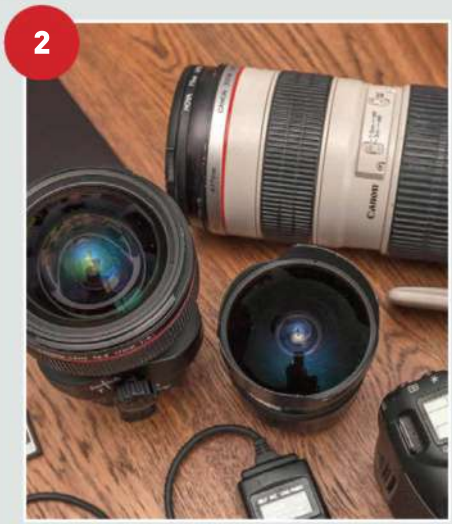


Choose the right camera

When you're looking to buy a new camera for your photography, make a list of your requirements and set yourself a budget. Don't forget to allow for accessories such as lenses, a tripod and cleaning kit if you need them. Don't fall in to the trap of thinking that a more expensive camera will make you a better photographer. You're much more likely to improve your technique by overcoming the limitations of cheaper kit than by spending more money than you need to.

2



Choose the right lens

If you're buying a compact system camera or DSLR, it will probably come with a standard telephoto lens that is ideal for general photography and snapshots but there is a wide variety of special lenses available for other types of photography. If you like to shoot landscapes, get a good wide-zoom lens but avoid super-wide lenses as these will distort the image. If you want to shoot wildlife, you'll need a high quality fast telephoto but this will be expensive.

3

Buy a tripod

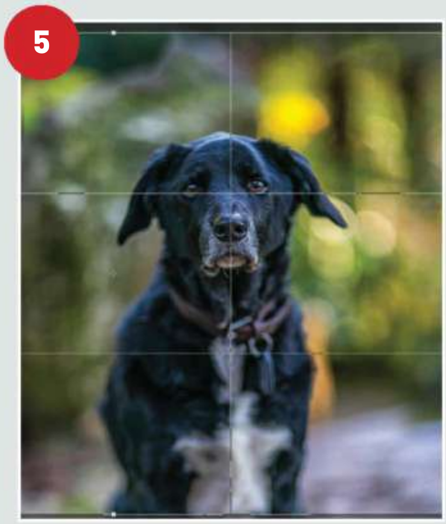
The quickest way to improve your photography is to invest in a decent tripod. For the best combination of strength, rigidity and portability, the ideal choice is carbon fibre. Carbon fibre tripods start at around £120 ($175, €165) and can cost ten times more, so if that's too expensive get a good quality aluminium one. Features to look for include a ratcheted centre column, portrait-format tilt and all-metal construction. Avoid ones with plastic heads, as they are seldom rigid enough to prevent camera shake on long exposures.

4

Early bird

Shooting a landscape in bright midday sun is fine but if you really want your shots to shine, you'll need to get up early and catch the light available just before the sun rises, and as it climbs above the horizon. The shadows are long, giving definition to objects and the light has that special golden ethereal quality. The same is true at the opposite end of the day, at sunset. The period of time around sunrise and sunset is called the golden hour. Simply switching the time you take photos can have a dramatic improvement on your shots.

5



Visual interest

The rule of thirds is a simple guide that can help the composition of your shots and make them much more visually appealing. When framing a shot, you have to imagine that what you can see through the viewfinder of your camera is divided into thirds both vertically and horizontally with lines, just like a noughts and crosses game (or tic-tac-toe if you are in the US). Placing your main subject on an intersection where these lines meet is a simple and quick way to improve composition.

6

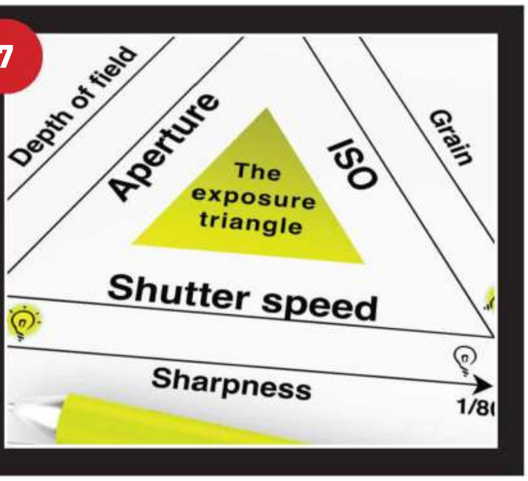
Pick a prime

Fast glass is much prized in the world of portraiture. Fast glass has very large apertures, letting in more light and offering faster shutter speeds in low-light conditions. A good portrait lens that has a maximum aperture of f/2.8 - f/1.2 is fantastic at creating the background blur so sought after by photographers. The quality of defocused light this blurring produces is referred to as bokeh. The ability to shoot at f/1.2, for instance, means you can shoot more natural light portraits, without the reliance on strobes.

The holy trinity

ISO, aperture and shutter speed are the three pillars of exposure. The main idea is that altering one of these three settings has an impact on exposure and therefore how your image looks. One or both of the other settings will have to be altered to maintain a balanced exposure. As you develop as a photographer, you will realise that once you are in control, you can create images that look more as you want, rather than what the camera thinks is right when in full auto mode.

7



Stop the shakes

Camera shake is the unwanted movement of the camera taking the shot and of the subject of the shot. Modern cameras offer image stabilisation and it can work well up to a point but the lower the light, the more the likelihood is that your shots will be blurry as you need longer shutter speeds to gather enough light for a balanced exposure. If you buy only one thing to go with your new camera, make it a tripod. Use a robust tripod and your images will be rock steady in all manner of challenging shooting situations.

8

Depth cueing

A photograph only has two dimensions and any indication of depth in a photograph is purely optical. One of the simplest ways to add depth is to use leading lines like the curve of sand on a beach image or railway lines converging towards the horizon. Another method is atmospheric perspective where mist and fog shroud distant objects making them lighter and with less tonal contrast compared to darker foreground objects.

9

Enhance your photos

If your camera has the option to let you shoot Raw images, use it. A Raw image is the key to much greater post-processing possibilities. Raw images, as the name suggests, are just unprocessed raw data straight from the camera sensor with all the information you need to bring out a beautiful photograph. The act of cropping the shot into a more pleasing aspect ratio can save an image, as can turning it to black and white. The choices are endless, even if it's just contrast, saturation, brightness and sharpness.

10

11

MENU
DISP.
1/50
ISO 1600
Tv
AWB
MF
SET
Canon
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ON
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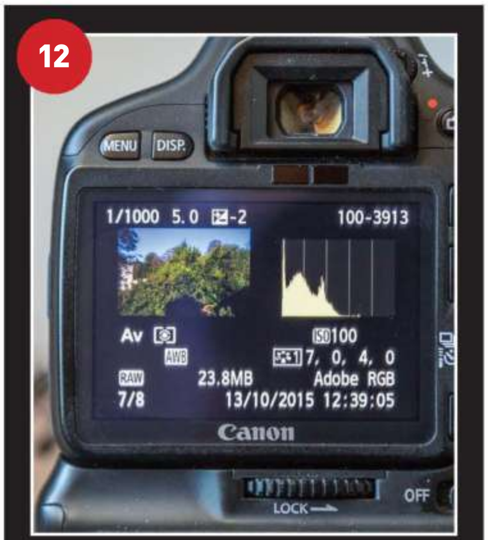
Are you compensating?

As good as cameras are, they will often overexpose and underexpose your photos in challenging lighting situations. That's where exposure compensation comes in. It's a common setting found on digital cameras and it lets you override the camera by making the image lighter or darker based on how much positive or negative exposure compensation you dial in. A lot of cameras will let you preview the result on your LCD screen and once you are happy with how it looks, you can take the shot.

12



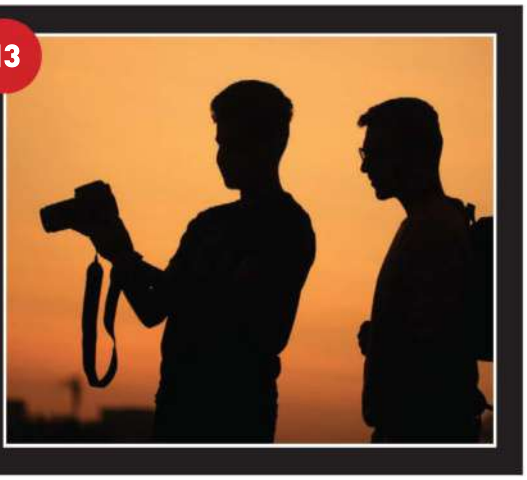
Don't fear the histogram

A histogram is a graphic representation of the tonal values in your photograph and how they are distributed. If the graph is bunched at the far left of the display, then your shot is very underexposed and you risk the loss of a lot of detail to shadow areas. If it is sliding off the right hand side, then it will be overexposed and detail will be lost in the highlight areas. A good exposure will have all the major tones in the middle of the histogram.

Learn from others

Even the best pros had to pick up a camera for the first time. There are any number of photography forums that you can join and then get advice from other photographers. Why not join a local photography club? It's a great way to meet fellow like-minded photographers of varying skill levels. It's is also a good way of getting motivated to get out and take more photos. You're also more likely to be able to chat with those who are well versed in using software to post-process their images.

13



14

Further afield

Find a lovely location that you want to photograph and research the area a little, then get yourself out there. Plan to arrive before dawn and get some amazing shots of the golden hour. Explore the area and experiment with composition and camera settings. In fact, just go crazy and enjoy the experience. That's the key to photography. It's there to be enjoyed. Don't worry about making mistakes; keep those shots and review them when you get home and figure out why they didn't work, it's all part of the process.

Out of the shadows

While a bright summer day may seem like the perfect time to take photos, at midday every scene will appear flat and featureless with shadows sitting directly beneath every object. The perfect weather for outdoor photography is a bright day with a few white clouds to help diffuse the light and take the edge off the shadows. The perfect time is around sunrise and sunset, with the low sun casting long shadows that will help accentuate the contours of the land.

15

16

Batteries

Your digital camera can't operate without power, so make sure you fully charge the battery before taking it out for the day. If you're going away for a holiday remember to take your battery charger and an adaptor for foreign mains sockets; and maybe consider investing in a spare battery or external battery pack in case you can't charge it for a while. There are also several devices available that can charge your battery using solar energy or from a hand cranked mini-generator.

A sense of perspective

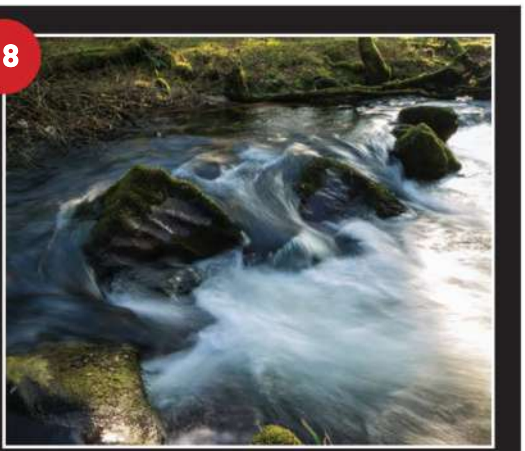
An average human, taking a photograph, is viewing the world from their eye level of about 5 feet. Simply changing that viewing angle can radically alter the shot. As a simple rule of thumb, shoot from low down, shoot from high up. Getting above or below your subject alters how you present your subject and how they fit in the world that's around them. You can play with wide angle shots or telephoto shots. You have an amazing amount of choice. Anything to break away from the eye level world that we are used to.

17

Maximum exposure

Consider using longer exposures in your landscape shots. Photographers often employ exposures that last seconds or even tens of seconds, to show clouds streaking across the sky rather than looking static and puffy. Scenes shot with a much longer exposure will turn the water to a misty, milky fog. It is safe to say that your tripod is the key to the success of these shots, as is a good set of ND filters to drive up those exposure times. Filters around the 4 - 8 stop range are perfect.

18



19

Whatever the weather

Remember that the weather is part of the landscape too. While a nice sunny day is perfect for outdoor photography, natural weather effects such as mist, clouds and even rain can be used to create an attractive photo under the right circumstances. Make the weather part of your composition. Try capturing mist in early morning light, or raindrops hitting puddles or the surface of a lake. Cloud formations can add a lot of interest to the composition of a panoramic landscape shot.

20

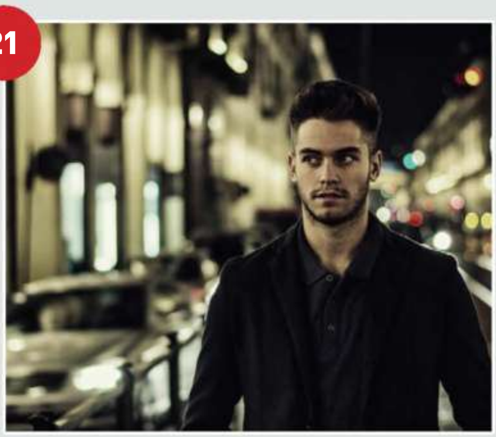
Night photography

You can capture amazing photos of the stars on a clear night by setting your camera on a tripod, setting the aperture to its widest position and using the 'B' exposure setting and a cable release to hold the shutter open for five or six minutes. Make sure you're well away from any light sources such as street lights or passing cars. If you point your camera towards the Pole Star (or the Southern Cross) you'll capture the apparent circular motion of the stars as the Earth rotates.

21

Low-light

When shooting in low light the most important thing to remember is that your camera's exposure meter will try to brighten everything up; this can cause problems with image noise at higher ISO settings. To capture dimly lit subjects against a dark night-time background, try reducing your exposure by a couple of stops. This will also help to reduce the blurring caused by camera shake and moving subjects during long exposures. Use a tripod if you have one.



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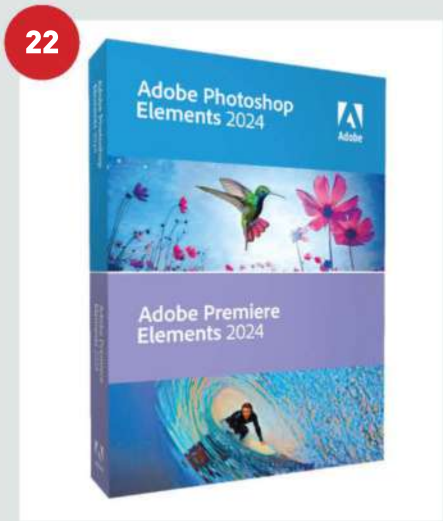
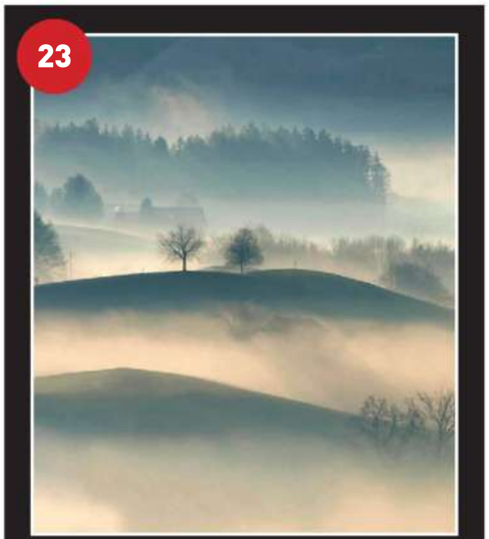


Photo editing software

To get the best out of your photos you'll need photo editing software. You can make simple edits with the Photos app that comes with Windows or with Photos on a Mac but for more accurate and detailed work you'll need something more capable. The best is Adobe Photoshop but with a monthly subscription fee, it may be too expensive for most hobby users. Fortunately, there are plenty of cheaper options, including Adobe Photoshop Elements 2024.

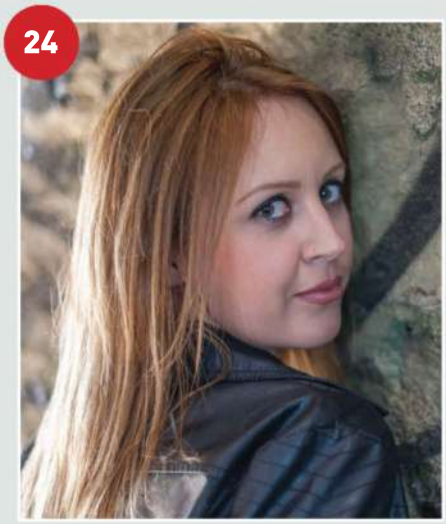
23



Cold conditions

Cold conditions can cause a few problems for your digital camera, the main one being its effect on batteries. You'll find that even on a cold morning after a clear summer night, your battery will only last around half as long. Make sure that you keep a spare battery in a warm inside pocket and swap them over when the first runs out. When you take your camera back indoors, keep it in a sealed plastic bag until it has warmed up. This can really help to avoid condensation problems.

24



Natural light portrait

Have you thought about shooting your portraits outdoors to take advantage of natural light? Try positioning your subject so that their face is well-lit but don't believe the old tip about having the "sun over your shoulder". You should avoid having them face directly into the sun, because this will cause them to squint. The best option is to have them stand in bright shade, or near a white wall or other light coloured object that will reflect a flattering diffused light.

Leading lines

There are many rules and guidelines for photographic composition but one that applies most often to landscape photography is the concept of leading lines. When composing your shot, try to find lines in the scene, such as roads, rivers, railway lines or hedges. Frame your shot so that these lines will lead the viewer's eye into and through the scene. They will also help to give the scene a sense of scale and perspective and this will also help with your composition. It doesn't matter if they are straight or curved.

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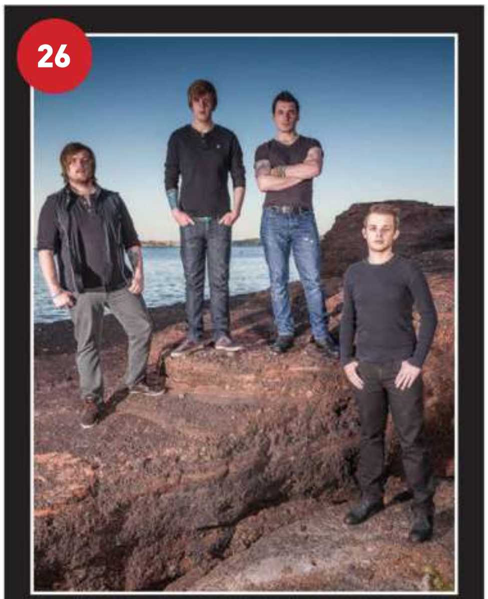


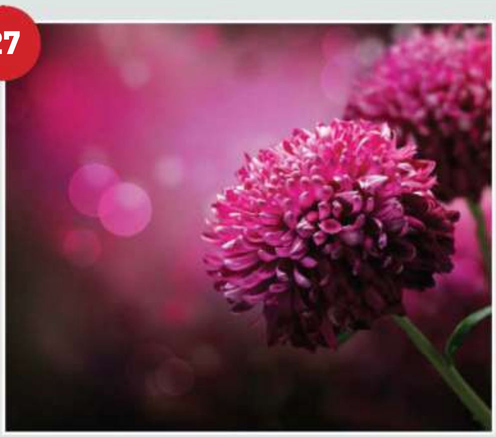
Group portraits

If you're shooting a group portrait, try to find a location that lets you position your subjects at different heights. A set of broad steps, a low wall, a park bench or even the trunk of a fallen tree make ideal impromptu stages, and add interest to what would otherwise be a fairly dull photo. Position shorter people at the front of the group or get those at the front to kneel, so that everyone can be seen clearly in the shot.

Depth of field

Depth of field is the distance between the nearest and most distant objects in a scene that are in focus and acceptably sharp. It is controlled by a combination of aperture and focal length and is an important creative tool for improving your photographs. Use a shallow depth of field (with a wide aperture) to isolate subjects against a blurred background, or use a large depth of field (narrow aperture) to capture an entire scene in sharp detail. Portrait photographers love shallow depth of field.

27



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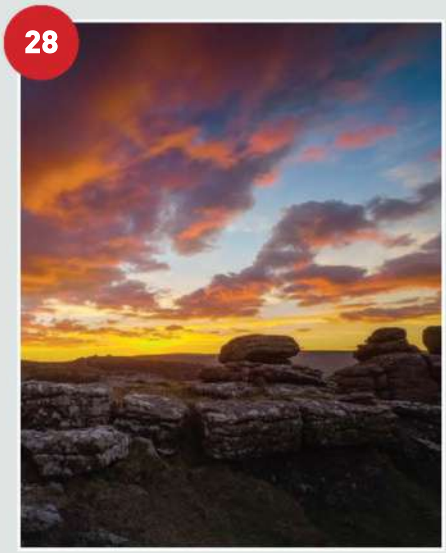


Time of day

When shooting landscape shots, the time of day is all-important. You can't control the position of the sun in the sky, so you'll have to wait for it to be in the right position to provide the best lighting for your scene. Make a note of sunset and sunrise times and try to visit the same location several times at different times of day. The favourite times for perfect lighting are an hour after sunrise and an hour before sunset, known as the 'golden hour'.

Position

Since you can't move the landscape around to suit your composition, choosing the right position to take your shot is all-important. Study the scene you want to capture and try to picture how it would look from higher up, lower down or from a different angle. Be aware of obstructions such as power lines and pylons, and try to choose a location that minimises their impact. The perfect location may involve a bit of hiking but it will be worth it. Don't stay rooted to one spot; be prepared to move around a lot.

29

Harmony and balance

There's more to a good landscape composition than just a snapshot of some nice hills. Try to include foreground detail such as old walls, rock formations or plants. They will add depth and a sense of perspective and scale to your picture, and make for a much more interesting composition. Try to balance foreground detail with background detail to create a harmonious balance to your composition. Using the rule of thirds will help you greatly.

30

31

Close-up

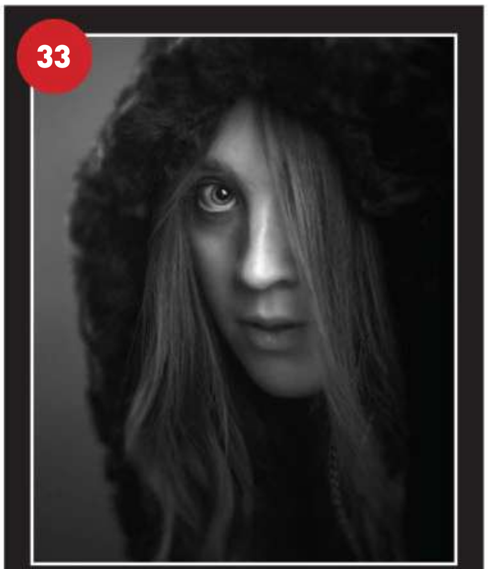
Good close-up photography requires either a camera with a very close minimum focusing distance or a special macro lens. The main problem with extreme macro photography is that the object you're focusing on will be in the shadow of your camera, so try to arrange lighting from the side. One handy gadget to try if you plan to do a lot of close-up work is a ring flash, which provides even illumination from all sides.

32

Hot weather

Hot weather can also cause some problems, with condensation and high humidity being at the top of the list. Keep a couple of bags of silica gel in your camera bag to absorb any stray moisture and wipe off any surface condensation as soon as it forms, to avoid it seeping inside your camera and messing up the electronics. Keep your lens clean too and avoid the problem of fungal blooms growing inside the lens barrel.

33



Black and white

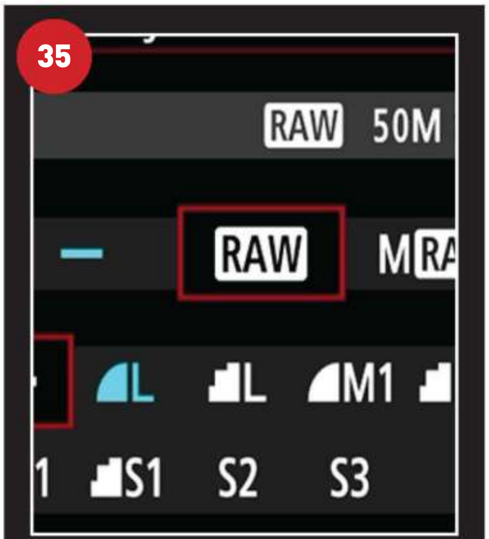
There are many subjects that can look great in black and white, particularly portraits, rough textures like old stone, and even landscape shots. However the black and white mode on your camera may not do the scene justice. You can get much more creative control over the final appearance of the image by converting the photo to monochrome using photo editing software. This is especially true if you shoot in Raw mode, with its much greater tonal range.

34

Focal length

Focal length, or the zoom setting of your lens, is one of your most important creative tools. Longer focal lengths let you get closer to distant subjects, whilst wide angle settings let you capture more of your surroundings. However, most people only ever seem to use the minimum and maximum settings. If you do this you're missing out on a lot of creative potential. Use focal length creatively to improve composition or to focus attention on details in a scene.

35



Raw mode

Most high-end cameras, and even some of the better mobile phone cameras, have a feature called Raw mode. This is the equivalent of the negative in a film camera; you can take the Raw image data and process it yourself using image editing software such as Photoshop. The advantage is that the Raw mode file contains uncompressed data with more colour information and tonal depth than the processed JPEG image that your camera usually produces, so you can do more with it.

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Get on their level

Children, as you may have noticed, are usually considerably shorter than adults, so all too often when photographing them they're either looking awkwardly upwards into the camera or you can only see the tops of their heads. When photographing young children, try kneeling or sitting down, so that you're more or less on their level. You'll appear less intimidating and your picture will capture the world from the child's point of view.

CREATIVE PHOTOGRAPHY

Learn the techniques that the professionals use

Now you're familiar with how your camera works and how to use its many features, you're ready to start learning the creative techniques that professional photographers use to achieve great results time after time. By learning and using a few simple techniques you can turn your photographs from well taken snapshots into works of art of which you can be proud.

Professional photographers use some very simple tricks and rules-of-thumb that have been developed over many years, including rules of composition that are inspired by classical art. Combined with technical skill and a thorough understanding of the principles of photography that we laid out in the previous section, these artistic methods will ensure that you can produce well balanced, attractive photographs that will really stand out and express your own personal view of the world around you. ■

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> *"By learning and using a few simple techniques you can turn your photographs from well taken snapshots into works of art of which you can be proud."*

Rural and natural landscapes

Capture the countryside in all its rugged beauty

There is often a misconception among budding photographers that landscape photography is something of an easy option when deciding on a subject to capture. Sometimes it only takes a twenty minute drive to transport you from your local town and put you among the marvels and beauty of the natural world. While it is certainly true that the natural world is very accessible, it can be another thing altogether to create memorable landscape images. It isn't just a case of arriving at a destination, firing up your DSLR and snapping away like a mad thing. The skills you may have that enable you to operate your camera are quite distinct from those that allow you to envision a beautifully composed image within the landscape you currently find yourself. Both are dependent on each other to deliver great landscape images.

A sense of scale

When you step out into the environment, the first thing worth considering is the scale of the scene you want to capture. Although we have mentioned the wide-angle lens as the primary lens to consider for landscape work, you don't have to stick with accepted rules and it's up to you to challenge yourself and the rulebook. Sometimes, knowing what to leave out of your photograph, is just as important as what to include.

The broad canvas

The wide view is the first order of the day for most. Covering a huge expanse in your shot can make for immersive images but be aware that a wide-angle lens will capture a very large field of view that has the effect of making any points of interest look very small in the frame. Also consider that if you have included some foreground interest close to your camera and shoot it at a wide focal length such as 14mm -16mm, it will appear distorted. Wider views are often best captured at either end of the day during the golden hours when the sun is very low on the horizon.

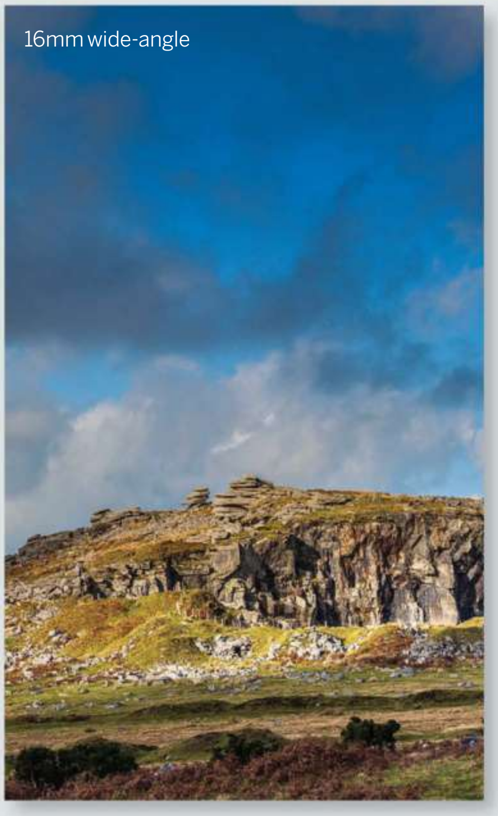
A picture in a picture

Next comes the more intimate landscape. It can actually be an effort of will sometimes to force yourself away from the wider view and consider shooting a more intimate landscape. This is where you zoom in or move closer, to isolate a particular aspect or detail from the whole landscape and show it as if it were a scene within a scene. It may seem counterintuitive but there is a good case to be made for using a telephoto lens in cases like this to pull a particular feature towards the viewer. Although not a rigid rule, diffused or indirect light is often used to capture greater detail because of the lower contrast that this diffused light brings.

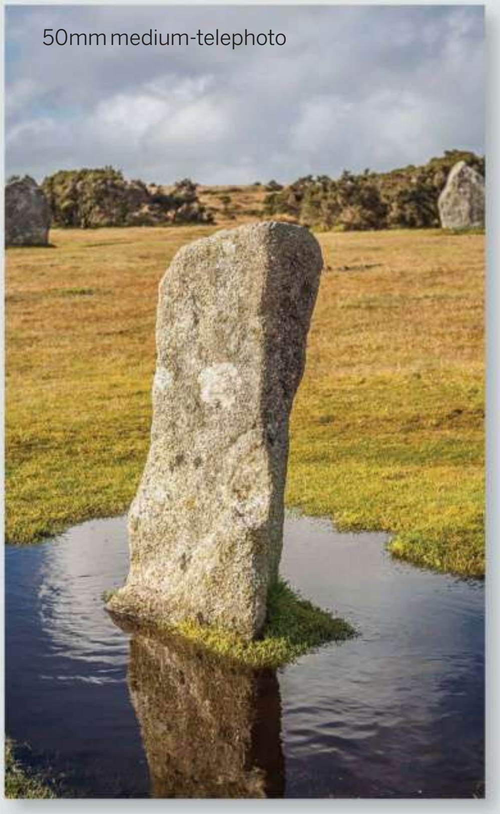
UP CLOSE AND PERSONAL

At the other end of the scale comes the macro landscape. This is where you deliberately focus very closely on one tiny element of a scene. Often you are drawing attention to something that is too small to be seen by a casual viewer. It can be an interesting challenge to find a tiny detail that in some way echoes the grand vista from which it is derived. Back-lighting or side-lighting can help accentuate objects for a more 3D feel but watch out for strong light coming down at a high angle, creating deep pockets of dense shadow that can potentially destroy all visible detail.

> "While it is certainly true that the natural world is very accessible, it can be another thing altogether to create memorable landscape images."

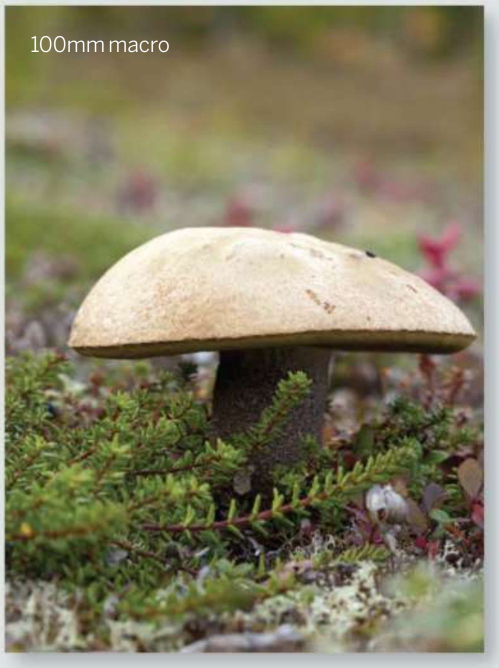


16mm wide-angle

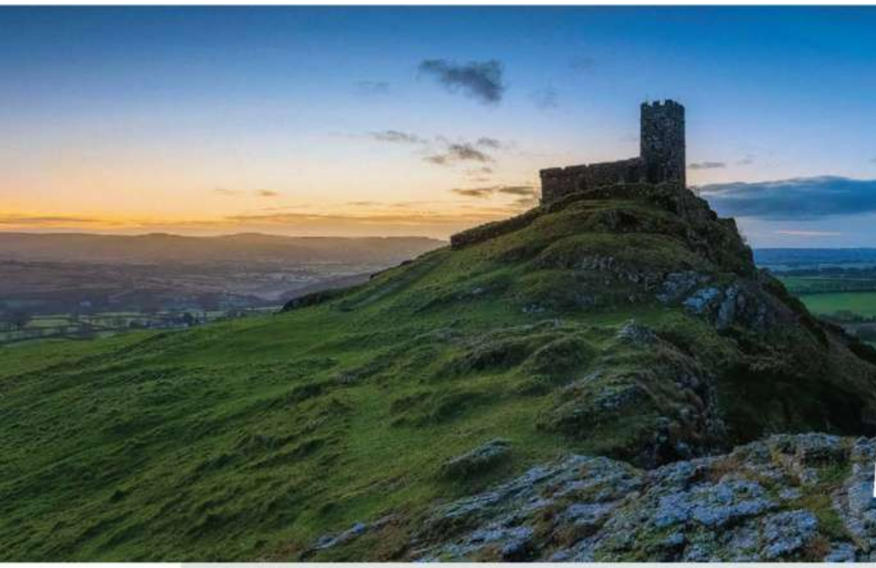


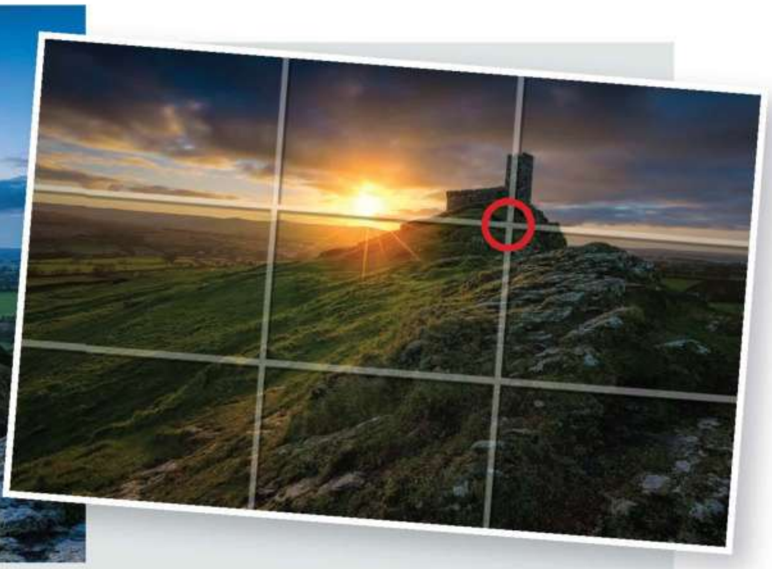
50mm medium-telephoto

You don't always need to capture the widest view possible, even if it seems the likely thing to do. Sometimes a closer, more intimate shot can be effective, even down to the macro level if you should so wish.



100mm macro





(Above) this image of Brentor, near Tavistock, was taken about 15 minutes before sunrise. **Compare it to the second** image [right] taken a few minutes after sunrise. The tones have transitioned from cool blue and pale yellow/orange hues to much stronger warm orange and yellow tones. The shadows, initially soft in the pre-sunrise image, have given way to much more defined shadows which will continue to become more harsh and deepen as the sun rises higher in the sky.

Rule of Thirds composition technique places a point of interest on one of the lines or intersection points of the grid.

Rules? What rules?

It has become a bit of an overused cliché but the rule about there being no rules, still rings true. Rules can aid you in arriving at a pleasing landscape image but you should always have an idea in your mind about what works for you. The view through your camera's viewfinder should move you in some way, it should speak to you. Even if what it is saying is that you should try another view somewhere else that has more visual impact. At the risk of introducing even more cliché into the mix, here are some inspirational quotes that make a lot of sense.

EDWARD WESTON

"To consult the rules of composition before making a picture is a little like consulting the law of gravitation before going for a walk."

ANSEL ADAMS

"There are no rules for good photographs, there are only good photographs."

The raw materials

Any landscape image is a collection of visual elements, captured on film or via a sensor and framed accordingly by your choice of lens or cropped during post-work. Take a moment to distil the scene in front of you into its component parts before you take a single shot. Slowing yourself down and taking a more considered approach to your landscape photography will yield results.

Framing the shot

Look out for a focal point and apply the Rule of Thirds framing technique. Objects such as a hill, church, tree or animal can be placed over one of

> *"Any strong curves or diagonal lines running up into your shot from either corner will enhance the image by leading the viewer's eye into, and around the scene."*

Back lit scene as the sun rises.

Side lit scene after sunrise.

If you're shooting directly into a sunrise there will come a point, as the sun gets above the horizon, when it will be just too bright to shoot successfully and you run the risk of lens flare and damage to your own eyes by looking at the rising sun for too long. That is a good time to simply rotate your camera by 90° or more away from the sun and shoot your scenes either side lit or front lit.

the intersecting gridlines. Use this as your starting point in composing your shot. Don't be afraid to shoot in portrait orientation if a particular feature demands it; so you don't have too much dead space either side. Any strong curves or diagonal lines running up into your shot from either corner will enhance the image by leading the viewer's eye into, and around the scene.

Light it up

For a landscape photographer, light is the first and best raw material you have available to you. It will shape and colour the image, so you need to look out for the quality of the light. Knowing where and when the sun sets and rises in a location is a key first step before you embark on a journey into the great outdoors. As we've said before, the golden hours are some of the best times to shoot landscapes, but you need to be aware of how the light changes from a soft, cool, indirect glow when the sun is still below the horizon, to the warm tones and long shadows created as the sun finally appears.

Shapes and form

The light in your scene will naturally have an effect on the shapes and form of objects within it. Surface textures and patterns will be revealed, as well as colour and tonal values. Consider if you want to shoot your scene back-lit, with the sun in front of you, casting shadows in your direction or whether you turn the camera to shoot the scene front-lit with the sun at your back or off to the side.

Cut it out

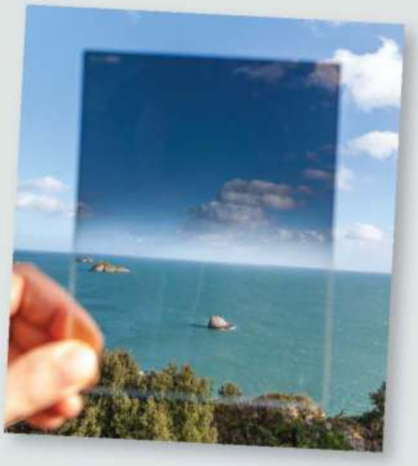
The final framing of your shot will determine if your photograph will stand or fall. Take your time with the final composition. Landscape painters will often use a piece of card with an aperture cut in it to use as a framing and compositional aid when viewing the landscape. There is no reason you can't do this too. Just match the aperture you cut in the piece of card to the proportions of your camera's sensor. Then, when you hold the card up to your eye at different distances you can clearly see the effect the different framing has on the look and feel of your shot.

Practice makes perfect

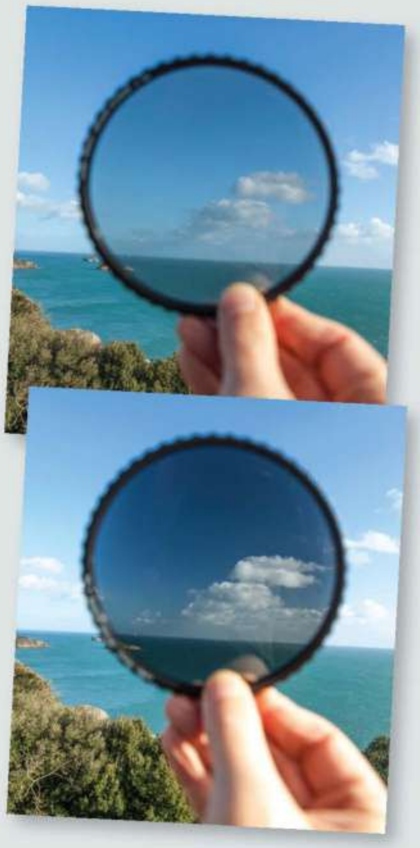
Here comes another cliché but one that is the basis of any learning experience. You can learn to 'see' with practice. As you photograph more, you learn more of what makes a good shot. The more you explore the more capable you are of making a good landscape photo, a great landscape photo. ■

KEEP YOUR BALANCE

Are you finding that you cannot get a balanced exposure between the land and the sky? If the sky is overexposed, you could always crop it out and create another composition that is a tighter framed version of what you had. If your sky is an important part of the original shot, then consider an ND grad to make a more balanced overall exposure. If you are shooting during the day with blue skies and white clouds, try using a polarising filter. It will boost the contrast between the blue of the sky and the white of the clouds.



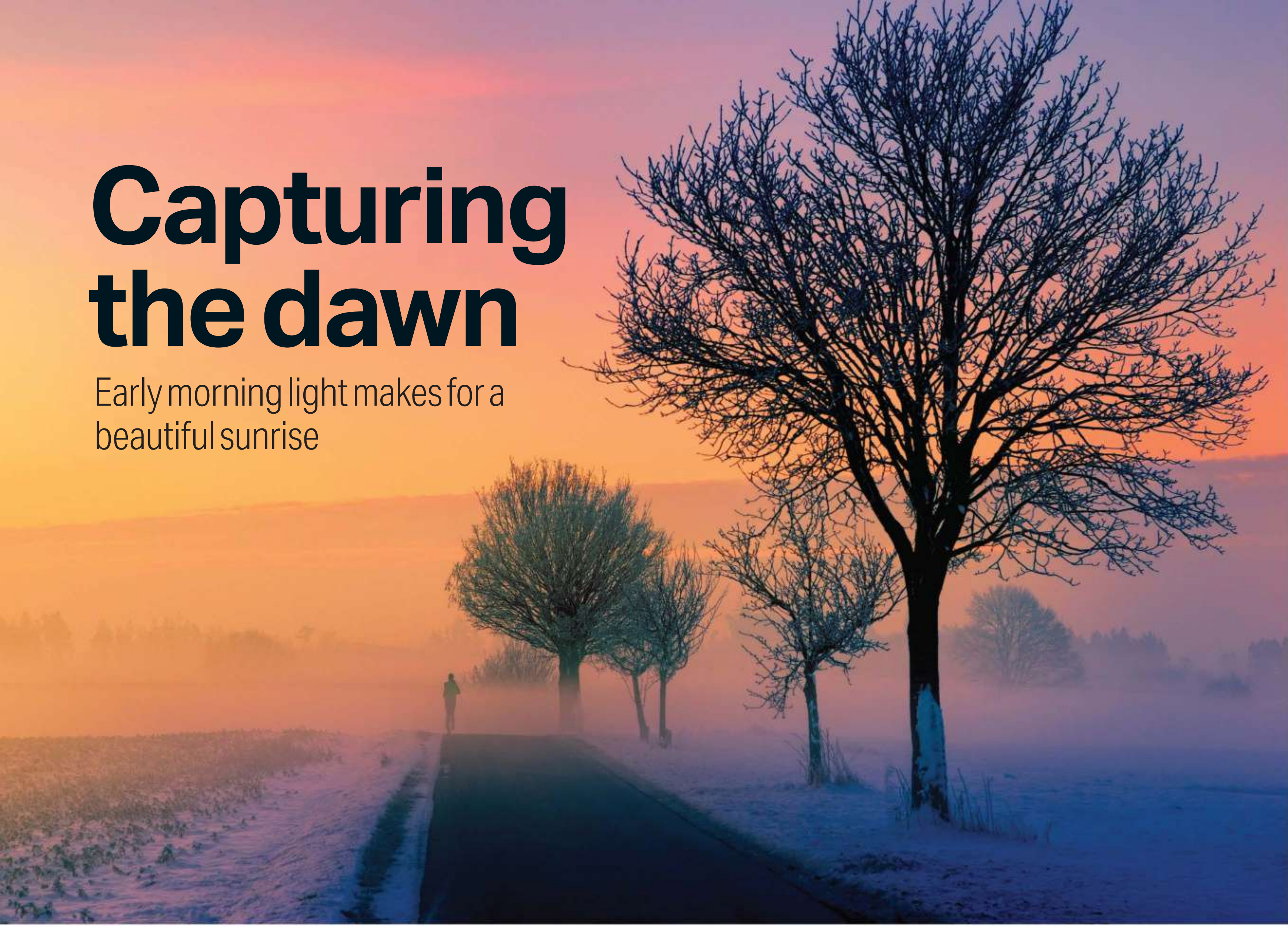
A 2-stop ND grad filter is a useful item to have in your kit bag. It can help restore balance to overexposed skies.



The circular polariser is one of those 'must have' items in your camera bag. Once you have yourself positioned correctly in relation to the sun (between 90° and 180° away from the sun), turning the filter will darken skies and whiten clouds.

Capturing the dawn

Early morning light makes for a beautiful sunrise



Photographers have a phrase, the "golden hour", which refers to the first and last hours of light in the day, but particularly the special light one only sees at dawn. To capture a shot like the one on this page requires not only precise control of exposure, but also the dedication and patience to wake up while it's still dark and get set up to take the photo before the sun rises. Since that beautiful morning mist depends on the weather conditions, you might have to try several mornings in a row to get a shot this good. You have to be really committed to your art to go above and beyond!

As for the technical aspects of the shot, the photographer has used a medium wide focal length of approximately 24mm, and a small aperture to keep a large portion of the scene in focus. The fog itself provides the main challenge. By careful use of metering the photographer has captured the soft colours and diffused light of the very foggy morning, giving the picture an ethereal and other-worldly look. ■

Mastering exposure metering allows you to cope with almost any lighting conditions, and opens up a whole world of creative possibilities. A beautiful shot like this is only possible with very precise metering and exposure.

Canon
24-105mm
IMAGE STABILIZER
ULTRASONIC
AF MF

A GREAT ALL-ROUNDER

The Canon EF 24-105 f/4 L II USM series wide-angle zoom lens; a great general-purpose lens with a decent wide-angle to telephoto zoom range and impressive image stabilisation for shooting in low light situations, such as the early dawn and dim interiors.

> *"That beautiful morning mist depends on the weather conditions, you might have to try several mornings in a row to get a shot this good."*

Misty water effect

Fast flowing water looks great with a slow shutter speed

This mist-like waterfall effect is very popular and looks great when it's done right. It looks challenging, but in fact it's very easy to set up. All you need is a tripod and any camera with manual shutter speed control.

The hardest part is finding a stream or river that has a nice photogenic waterfall or some rapids. Use your common sense and always exercise caution around fast-moving water; it may be deeper than it looks, with strong currents.

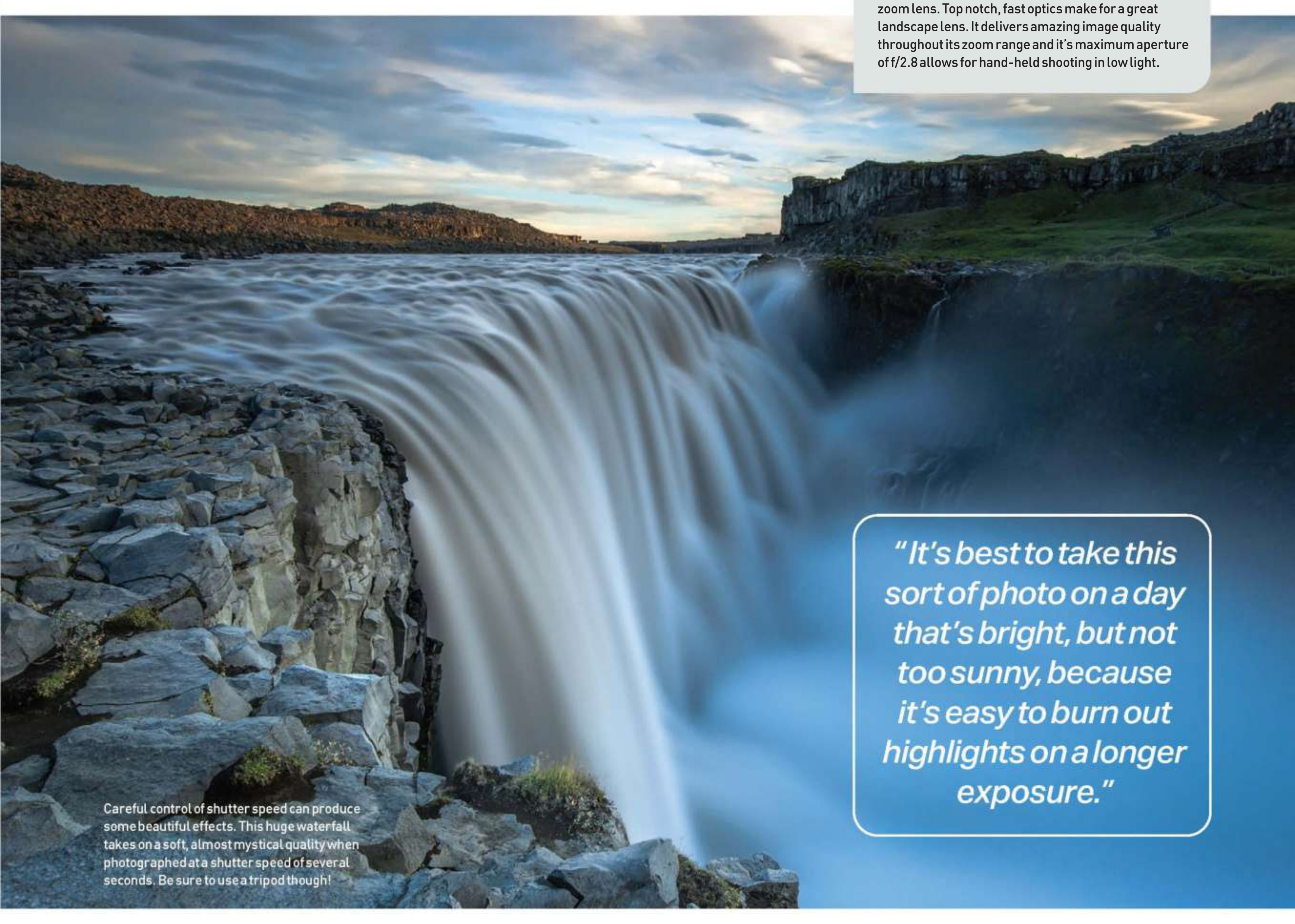
It's best to take this sort of photo on a day that's bright, but not too sunny, because it's easy to burn out highlights on a longer exposure. A calm day is best, because you don't want any trees or plants waving about in the wind and being blurred too.

Set up your camera using a good solid tripod on solid ground, and set the shutter speed to one second. Trigger the shutter using a cable release, a remote control or the two-second timer, so as to avoid any camera shake. You may need to experiment with different shutter speeds, depending on how fast the water is moving, but somewhere between half a second and two seconds should produce the effect you're looking for.

For longer exposures you may have to invest in a neutral-density filter to avoid over-exposure. ■

SEE THE BIGGER PICTURE

The Canon EF 24-70 f/2.8 L II USM series wide angle zoom lens. Top notch, fast optics make for a great landscape lens. It delivers amazing image quality throughout its zoom range and it's maximum aperture of f/2.8 allows for hand-held shooting in low light.



Careful control of shutter speed can produce some beautiful effects. This huge waterfall takes on a soft, almost mystical quality when photographed at a shutter speed of several seconds. Be sure to use a tripod though!

> "It's best to take this sort of photo on a day that's bright, but not too sunny, because it's easy to burn out highlights on a longer exposure."

Shooting panoramas and vertoramas

We show you how to think big and shoot big

The word panorama means 'an unbroken view of the whole region surrounding an observer'. In more simple terms, it means a photograph containing a wide view. A vertorama is simply a panorama that is shot in a vertical orientation. It all came about in the 1700s when artists would paint a horizontal image that encircled an entire room. These wide, expansive views are much prized by landscape photographers who strive to capture entire vistas to give the viewer of the final image a sense of the scale of the scene that was visible to them whilst they were there. Conveying all this 'bigness' would normally require the use of wide angle lenses. These lenses have short focal lengths of around 14mm to 24mm and can capture an angle of view of around 90° measured diagonally across the frame. This angle of view is an aspect of landscape photography that can be a slight issue for some.

Seeing is believing

One thing that a lot of people comment upon is that the scene they view with their own eyes always looks far grander and more impressive than the photograph they take of it. Human vision is amazing, it can encompass an angle of view that is almost a complete 180° if you take peripheral vision into account.

Of course a photograph is not going to be quite so impressive. However, there are methods that can let you capture super-wide vistas that go some way to emulating human sight. We have some tips on capturing entire majestic panoramas that will make your viewers go 'wow!'.

The images shown here are great examples of super-wide panoramas. Both are comprised of multiple portrait orientated shots and were merged using the Photomerge option in Photoshop.

This coastal image was captured on a Canon EF-S 10-22mm f/3.5-4.5 USM ultra wide zoom lens. Although the shot covers a roughly 100° angle of view as measured diagonally across the frame, there was still a lot more to be seen either side of the image that couldn't be captured in one go.

CHOOSE YOUR LENS

The Canon EF 24-70 f/2.8 L II USM
Top notch wide angle zoom with fast optics make for a great landscape lens.

The Canon EF 8-15mm f/4 L USM
Versatile full-frame or circular image fisheye zoom lens

The Canon EF 14mm f/2.8L II USM
A precision ultra-wide-angle prime lens.

The lens option

We mentioned that the best guy for the landscape photographer is the wide angle lens and those serious about capturing extremely wide views will be using a lens somewhere in the 14mm focal length range. Lenses like this have roughly a 105° angle of view, which is great. You can capture some impressive scenes with a 14mm lens. The problem for most budding photographers is that a major brand name lens like that is going to cost upwards of £1500 for a fixed focal length version. Step up to a variable focal length 14-24mm wide angle zoom lens and you can expect to pay a lot closer to £2000. That is out of the reach of most photographers. Manufacturers like Samyang do make a 14mm f/2.8 lens available for Canon and Micro Four Thirds fits at a much more reasonable £350. Be aware that a full-frame 14mm lens fitted to an APS-C camera for instance will actually behave like a 21mm lens, due to the smaller size of the sensor the full-frame image is projected on to. In this sense, the benefit of that 14mm focal length has been lost. That said, even in a normal frame taken with a wide angle lens, it is still only a relatively small part of the bigger picture.

Fisheye

Another option to capture large angles of view in your shots is to use a fisheye lens. A 15mm fisheye can capture an almost 180° angle of view image. The effect of a lens of this type is the distortion. Fisheye lenses are designed to actually show the spherical distortion you would normally not want to see in an image. The centre of the frame is quite acceptable but as you get to the edges of the image, you'll see the curved outer corners produce a goldfish bowl effect. For landscapes, this is not usually a desirable effect. Yes, you can remove the distortion at the post-process stage but that involves enlarging and distorting the image still further to remove the spherical view created by the lens in the first place. Any views that have strong horizontal or vertical lines in them will appear like something you would see in a funhouse mirror, so they are to be used with caution for landscapes. This still doesn't allow us to see the much broader canvas that our eyes see.

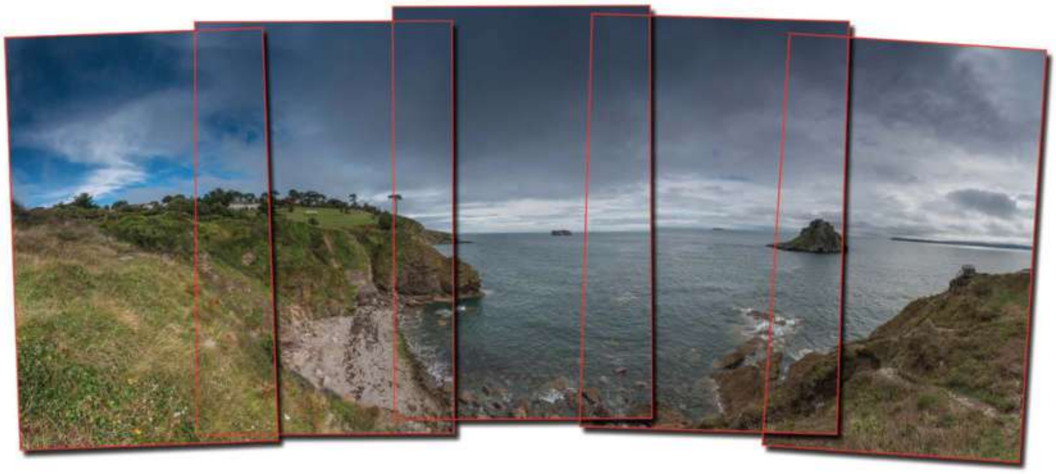
The alternative

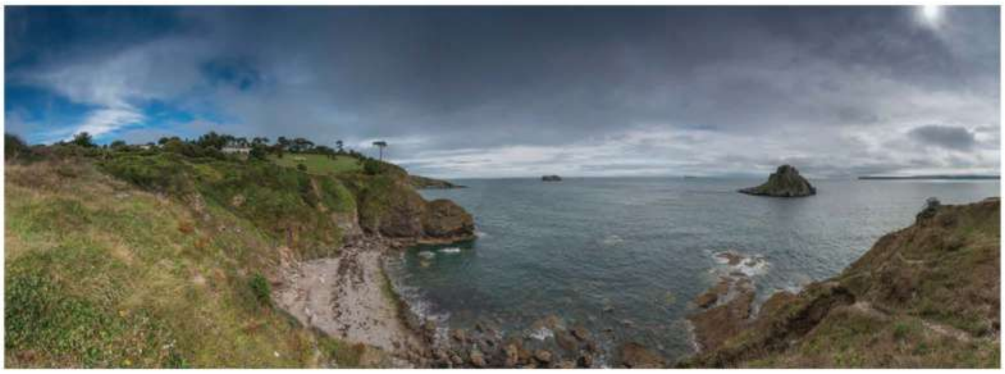
What happens if you do not have a wide angle lens or a fisheye? What are your options then? A lot of photographers who step up to a DSLR for the first time, will probably purchase a camera with a kit lens. A kit lens is a utilitarian jack-of-all-trades that can get you started in the world of photography. If you choose a cropped sensor camera such as a Canon EOS 2000D or Canon EOS R50, it invariably comes with a kit lens in the 18-55mm focal length range. In 35mm full-frame terms, the images you capture with it are actually more like a 27-82mm lens. A scene shot with this lens in landscape orientation is not going to be terribly impressive. It isn't a problem though since you can use the multi-image approach instead. Rather than take one landscape orientation shot, you simply turn the camera to portrait orientation and shoot a sequence of images for stitching together later. Let's explain in a little more detail.

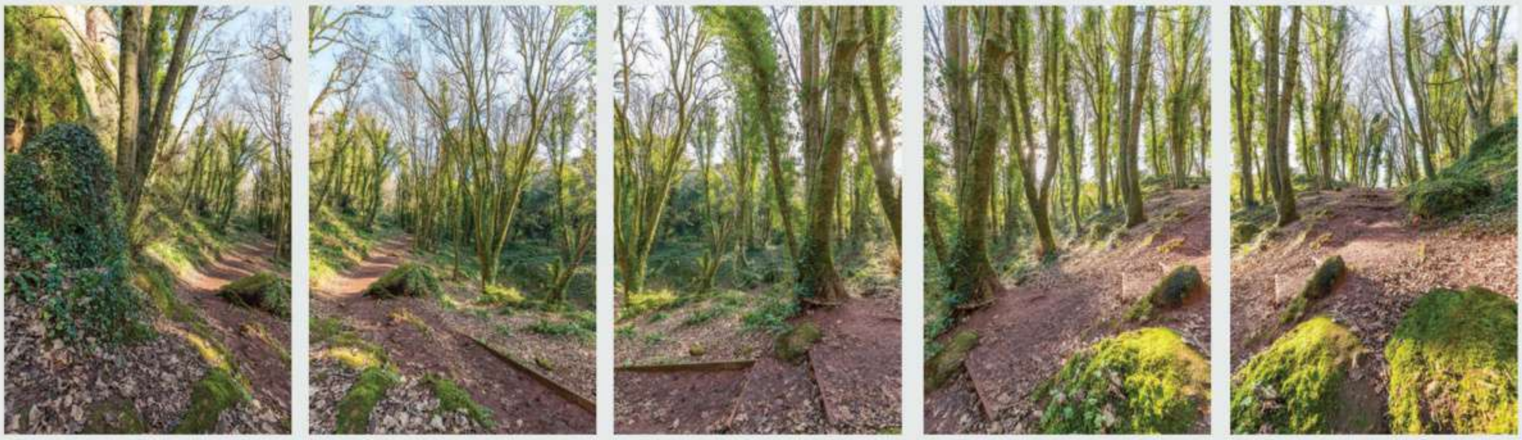
THE PROCESS

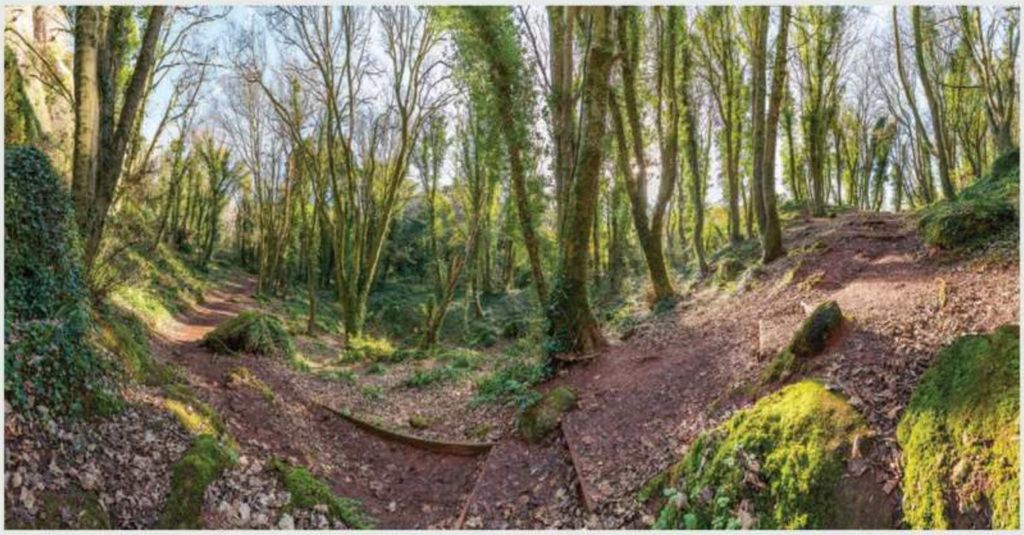
Essentially you are going to take a number of stills. Rotating the camera a few degrees left to right with each shot taken, whilst allowing enough overlap from image to image so that they can be stitched together. This can be achieved with programs like Photoshop, PT GUI or Hugin, that rely on features in each shot being matched together to create accurate stitching points; as a general rule, shoot with a shorter focal length lens and always try to overlap your images by 25% or more. For example, look for features that are right-most in your current shot like a car or building (something that isn't moving). For the next shot you rotate yourself on the spot so that those features are now left-most in the frame. These matching features will help your software to stitch the shots together more accurately and avoid odd tearing and mismatches that can spoil the image.

Another consideration is to try and avoid a scene where a lot of objects are very close to the camera. Unless you are using specialist panoramic photographic equipment and lenses, you will find that even slight unwanted movement and rotation of the camera will result in big parallax shift errors in very near objects that even the best software will not be able to put right. Parallax shift describes how objects close to you seem to move a greater distance relative to those that are further away when you move your head or camera.





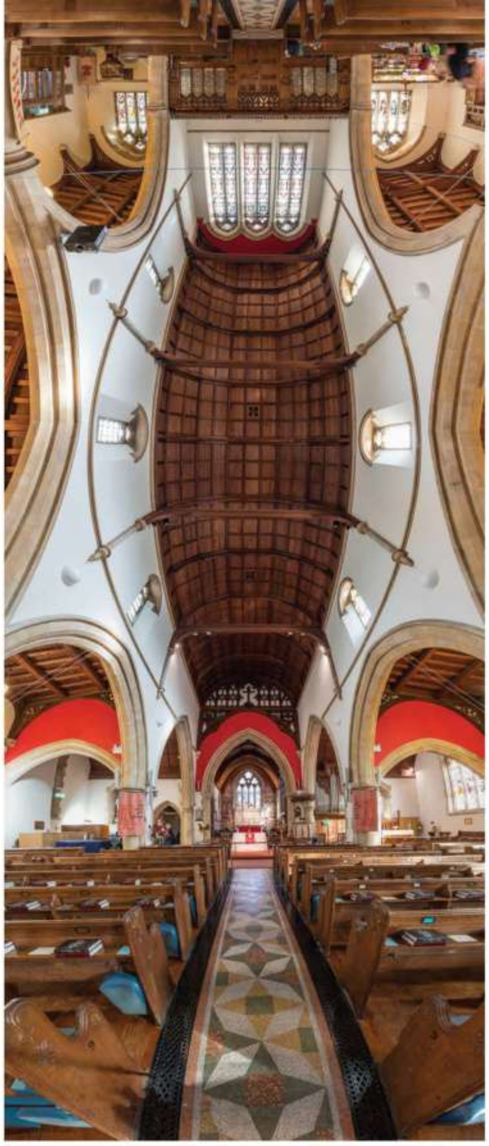




THE BIGGER PICTURE

The benefits of shooting multi image panoramas are twofold. You are of course capturing a much wider view than is possible with just a single shot; the other benefit is that when the image is stitched together, it creates a much larger file, containing more detail than a single ultra wide image. As an example, this scene was captured with 5 portrait orientation shots, each measuring 3333 pixels wide by 5000 pixels high. When the 5 shots were merged in Photoshop, the resulting panorama, once cropped, measured 9768 pixels wide by 4676 pixels high. Roughly speaking, the result is a 45MP image. Granted you do need a reasonably powerful machine with plenty of RAM to work with large files but the results are quite impressive.

> "There may be certain times when you might need to capture a panorama that doesn't fit into our happy horizontal world."



Settings to use

To capture a basic panorama from left to right you can set up your camera in the following way. First, set your camera to portrait orientation and set focus to manual. Select a point of focus roughly a third of the way into your scene. This is an utterly basic rule of thumb to quickly set yourself up to record as much sharp focus in your scene as possible. Working out the exact point into the scene that gives the best overall focus based on your aperture, referred to as the Hyperfocal Distance, is not to be approached lightly. For our purposes the most basic approach will do for now.

Your camera settings need to be set in such a way as to produce as little noise as possible but keep a fast enough shutter speed to avoid camera shake or motion blur. Camera shake is a main concern if you are going to choose to shoot hand-held and we would always recommend using a tripod whenever possible. For shot-to-shot colour and exposure consistency, it is always a good idea to shoot in manual mode and use a preset White Balance setting rather than Auto White Balance. If you shoot in Raw format, this is less of a worry since you can non-destructively alter the white balance of each shot to match your favoured colour temperature. With trial and error you can arrive at settings that yield enough detail on the ground and the sky without either losing detail in shadows or blown out highlights. It is also a good idea to use a narrow aperture of at least f/8 to ensure that your entire is a sharp as possible from front to back.

More accuracy

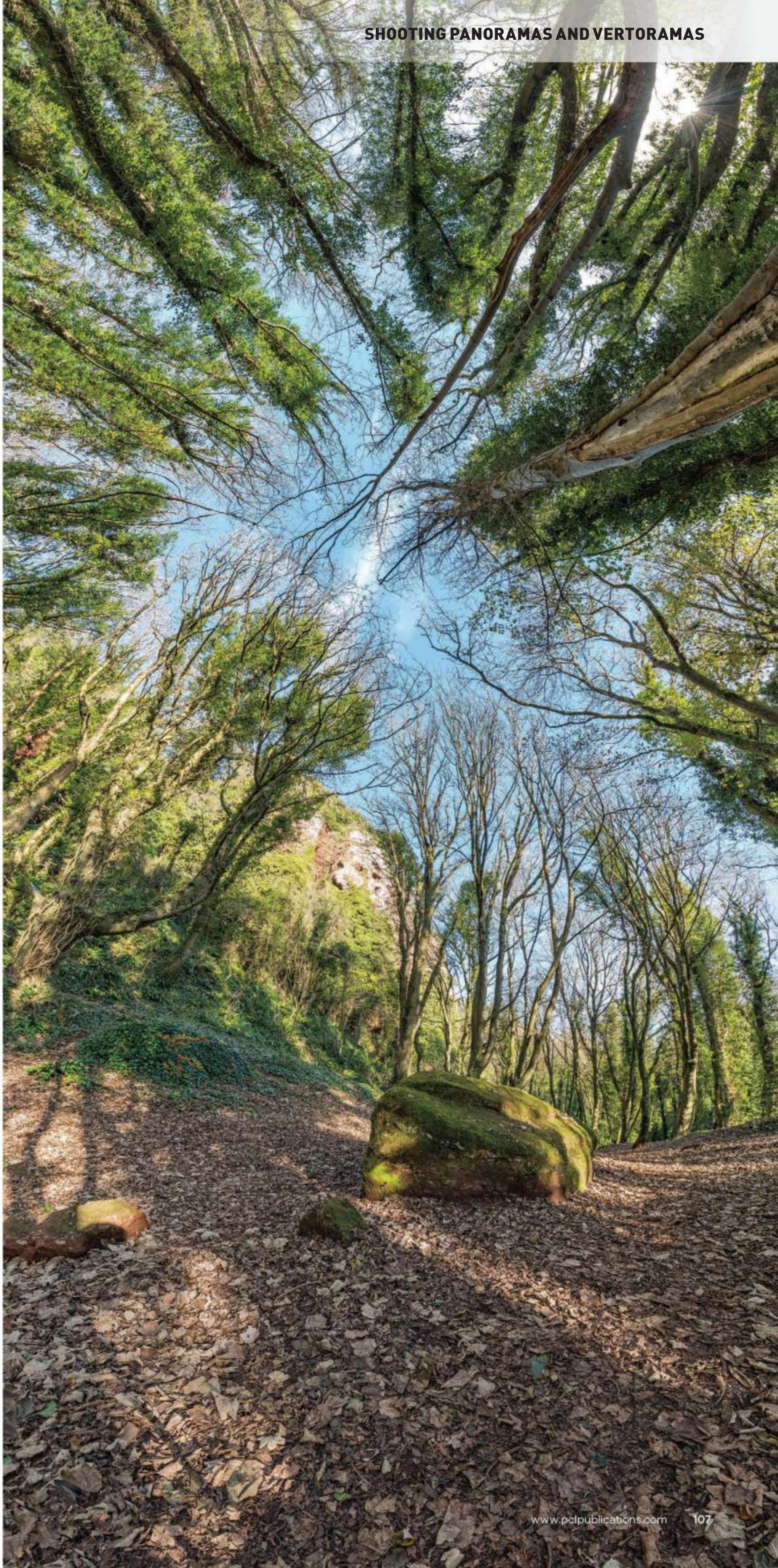
We would always recommend the use of a tripod when shooting panoramas. It creates a nice stable platform with rotation that is easy to control in both the horizontal and the vertical. You can level both the tripod and then the camera on the tilt-head by using a small spirit level that can attach to the hot-shoe of the camera. For even greater stitching accuracy, you can attempt to rotate the camera around its nodal point. The nodal point is the point around which the lens must rotate in order to completely eliminate parallax shift. Without specialist equipment it can be very difficult to achieve. The hi-tech method for shooting accurate panoramas is a device such as the Nodal Ninja. It is made from metal and is very robust with an optional levelling plate to provide a very quick way of getting things on an even keel. You can quickly shoot accurate and level panoramas with devices such as this. There is a very low tech way you can do it yourself, whereby you rest the camera lens barrel on a pole or stick (even a sawn-off broom handle) so the front lens is as near the pole's centre of rotation as possible. It will be up to you to keep the camera as level as possible but it does help avoid those nasty parallax shifts. Oh, and people will wonder why you are rotating around a pole stuck in the ground!

Go vertical

There may be certain times when you might need to capture a panorama that doesn't fit into our happy horizontal world. Sometimes, you need to think vertically. Vertical panoramas, or vertoramas as they are called, can produce some very spectacular and mind-bending images. The methods for shooting a vertical panorama are the same for those you would employ for a normal one. This time, you can actually shoot with your camera in landscape orientation but you pan from the ground and rotate the camera upwards to the vertical, and even over the vertical if you can stretch far enough (just don't fall over). Shooting a vertorama in the woods, city centre or an enclosed space such as a church or cathedral can produce some intense images. You are likely to end up photographing your feet or the legs of your tripod when shooting directly downwards but once you have stitched the images in Photoshop or other favourite program, you can crop or clone them out. With this in mind, make sure you give yourself plenty of room at the bottom of the frame for cropping.

Go wide

Shooting panoramas, whether horizontally or vertically, is a very diverting method of landscape photography. It does mean you are working with a large number of files and they need all that extra work to stitch them together but the result is a very large image file that is significantly larger than a single shot from your widest lens. Not only that, it contains a vast amount of detail and its larger combined resolution means that if it were ever needed, it could be printed at a huge scale with a reduced loss of detail. Give it a go: you can start with hand held versions and if you like it, you can upgrade to a good tripod; or better still, get yourself a Nodal Ninja for the ultimate panorama. ■

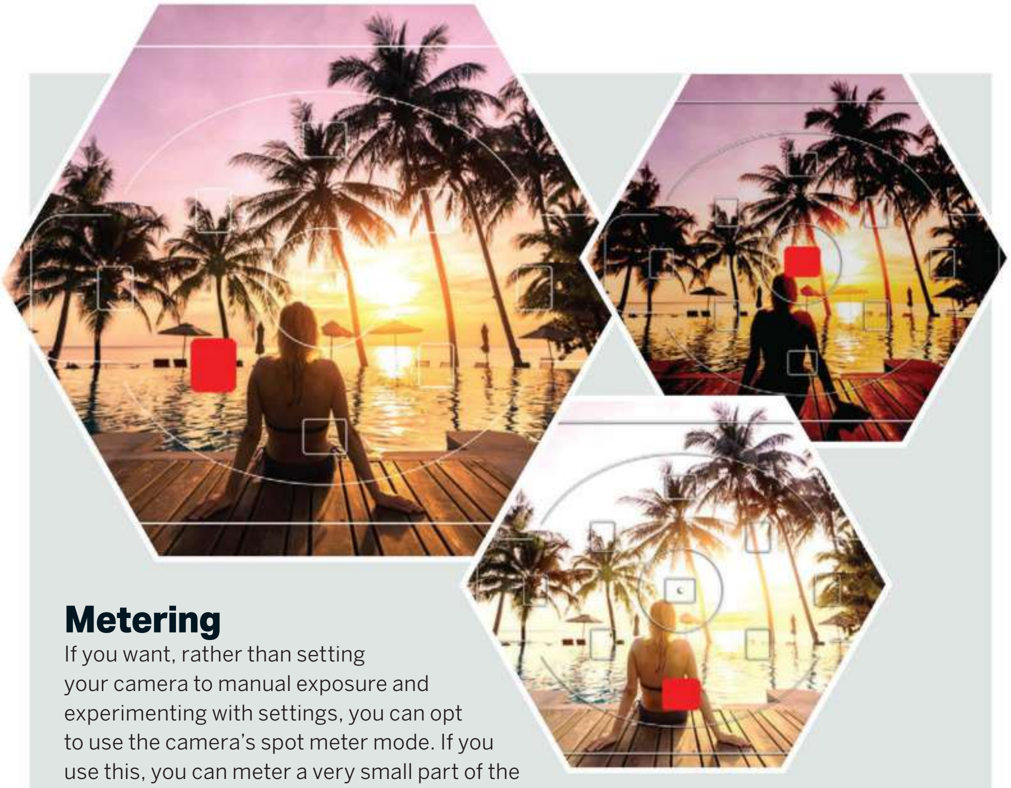


Shooting amazing sunsets

How it's done

> "Of course, good exposure control is paramount to ensure you capture as much of the tonal range of the scene as possible."

Surely, we all love a sunset? A blazing red sunset is lovely to behold and can make for some great photos, if you know how to get the most from the fiery scene in front of you. Of course, good exposure control is paramount to ensure you capture as much of the tonal range of the scene as possible. Moreover, the scene itself requires a couple of things to make it a success from the point of view of composition. A clear sky does not necessarily make for a good sunset. Clouds are the perfect addition to reflect the light and create visual interest in the sky. Now that the sky is sorted, you will need some foreground interest, more on that shortly. ■



Metering

If you want, rather than setting your camera to manual exposure and experimenting with settings, you can opt to use the camera's spot meter mode. If you use this, you can meter a very small part of the image (not the sun), that is a middle tone area, for a decent averaged exposure of the scene. Alternatively, you can actually meter a right point nearer to the sun's brightness and drop a lot of your scene out to silhouette. Beyond that, you can also choose to meter a darker area and really push the bright areas out to overexposure, if that is your creative choice.

Get the settings right

If you are feeling brave, why not take the camera out of automatic mode and go full manual? It's not at all scary to do and it gives you total control over your shot. Simply decide your preferred ISO and aperture and then just experiment with the shutter speed until you get a good balance of tones in the shot. It is always recommended to keep the ISO as low as possible in the first instance, for maximum image quality. A low ISO keeps your photo clear of noise and grain. If you are shooting hand held and the light levels are dropping, then you may have to consider a higher ISO to give you faster shutter speeds and thereby avoid camera shake.

Stop the shake

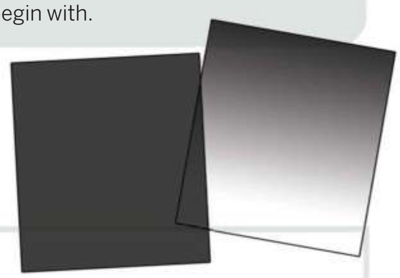
Generally, a sunset scene, or any landscape image, is shot with narrow apertures to give you as much front to back sharpness as possible. Apertures such as f/11 and f/16 are the best starting points for this. As previously mentioned, while you're working on your preferred settings, make sure you are aware of your shutter speeds. If they drop too low for a handheld shot, camera shake is inevitable. Shutter speeds of 1/60s are a bare minimum to eliminate shake. Otherwise, get a tripod involved. We've probably recited this mantra way too many times, but getting a tripod is the single most important item to have, after the actual camera and lenses.

Get the shot

So, we come to foreground interest. This is a key part of capturing a successful sunset image, or any landscape photo for that matter. Find something to put in the near foreground. A tree, a large rock formation, a boat on the water (if you're shooting near a body of water), it all helps to engage the viewer and give them a visual starting point when viewing the image.

Go hyperfocal

The hyperfocal point is a point in the scene that yields the greatest depth of field for any aperture setting and focal length. It does require some mathematics, so for those of us in a bit of a hurry, focusing on a point roughly one third into the scene is generally good enough to begin with.



Filters

Another item of equipment we would always recommend for landscape photography is the use of certain filters; In this case a graduated neutral density (ND) filter. This is a square filter that sits in front of your lens and can darken the sky while leaving the ground at its normal brightness. These are great for overly bright skies that need to be toned down in order to create a balanced exposure.

> *" Whichever way you look at it, colour distracts you from the heart of what should make a great photo..."*

BEFORE

Black & white photography

See the world in black and white as we introduce you to this timeless medium

At the dawn of photography as we know it, when everything was fresh and new, your only choice back then was to shoot in black and white. Exposing images onto glass or metal plates gave way to the film and chemical process. It wasn't until 1936 that Kodak gave the world colour photography. However, black and white didn't die off like the black and white TV, in fact it flourished.

Whichever way you look at it, colour distracts you from the heart of what should make a great photo. Things like texture, composition, form, lighting and good old storytelling can be swamped and made inconsequential by colour. It's not to say colour is an invalid medium. Black and white photography can be seen as your interpretation of what is real, whereas colour can feel more like a record of reality That may all sound a bit mystical, but in essence, many photographers would argue that black and white is probably the purest form of photography.

We could fill an entire book on its own with the intricacies of the black and white art, but there are some simple tips that can help you on your way to discovering why black and white photography is such a prized, creative, medium.

You would imagine that the starting point would be to grab your camera, set its functions to black and white mode and start shooting. Many photographers always shoot in colour, just so you maintain as much tonal variation in your Raw image as possible. It just gives you more data to play with when it comes to the conversion process. A key word in the last sentence was 'Raw'. Always shoot in Raw format. You want to record as much scene data as you can without your camera trying to process the image for you.

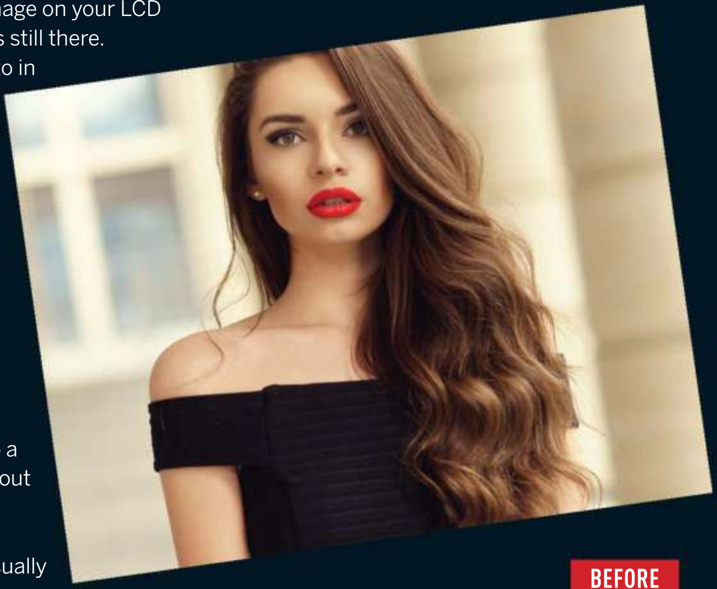
Although it might sound odd, you need to develop the ability to 'see' in black and white. A great visual aid is to shoot Raw, as we've said, but also set your camera's picture style to black and white. It displays a black and image on your LCD screen, but all the colour data is still there.

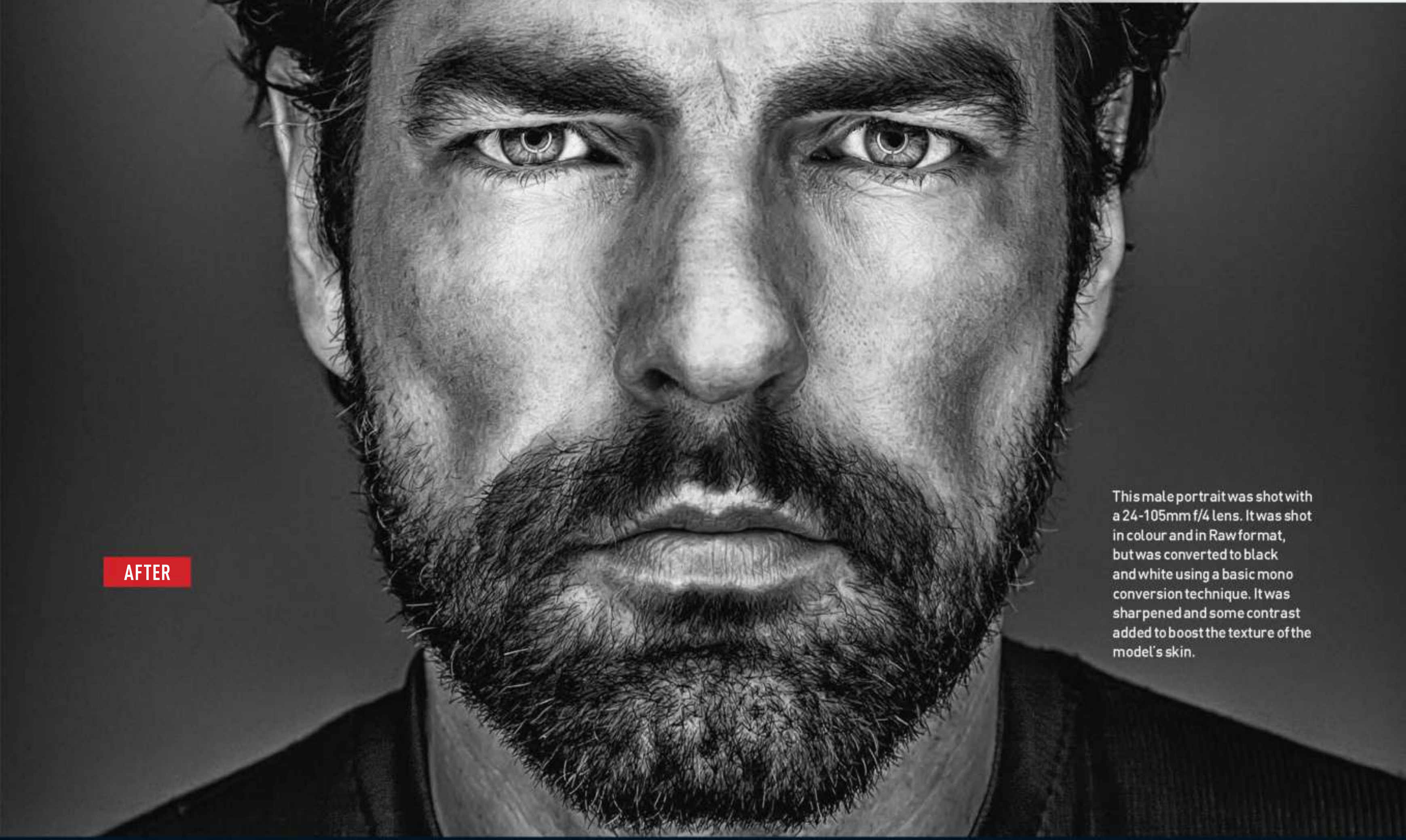
In its most basic form, a photo in black and white is made up of several components. Texture is a key ingredient, black and white loves texture. Harsh midday sun knocks everything flat, but the light glancing across a scene at sunrise or sunset makes texture 'pop' out of the image.

Tonal contrast is another important consideration. A flat image with very little contrast will not necessarily convert into a great black and white shot without some serious post-processing, although in some cases, low contrast images can be very visually appealing if done well.

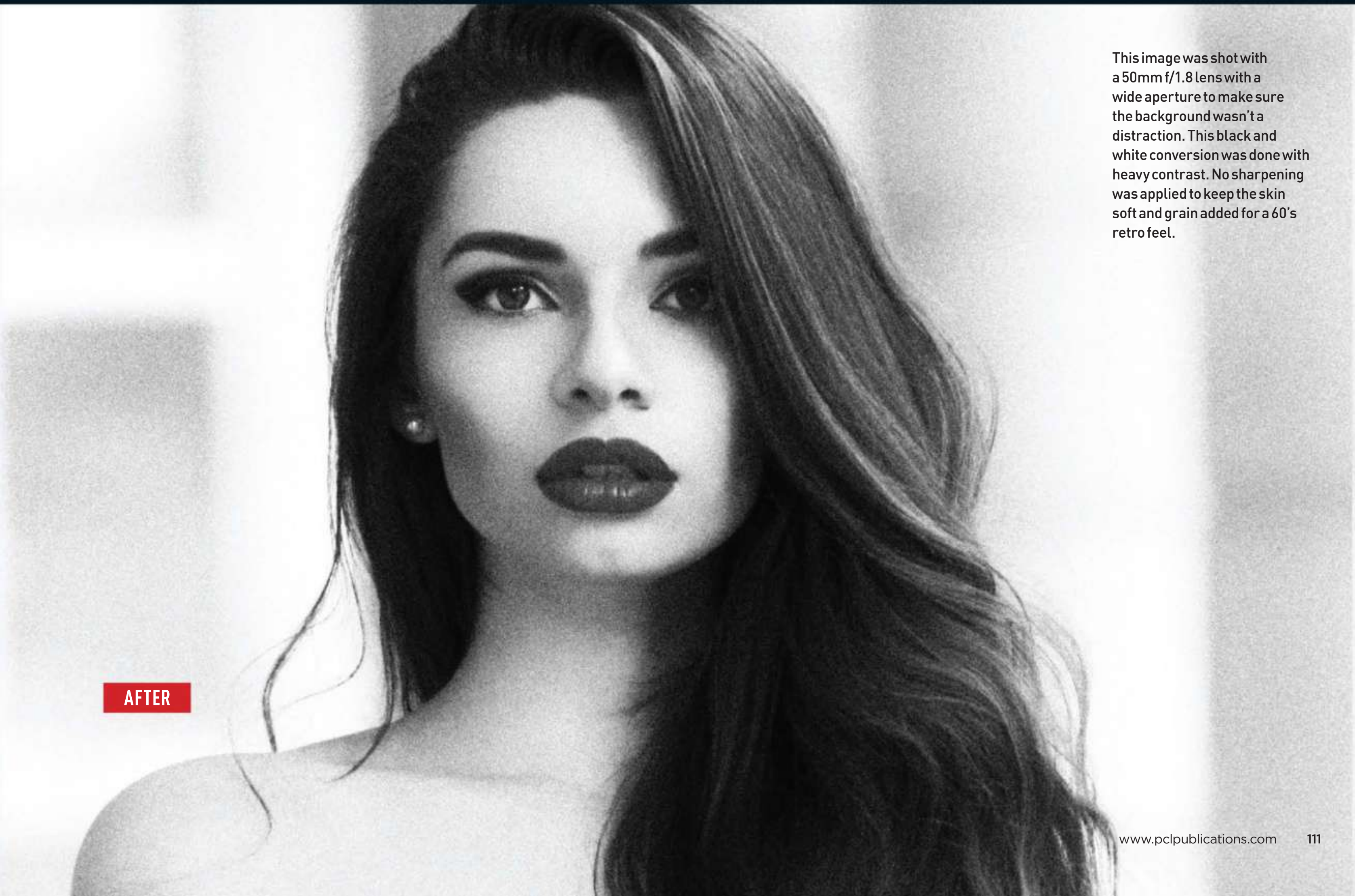
Shape defines how an object looks in its simplest form, as an outline or silhouette only. Images based on shape alone can be graphically intense. Form in a shot, shows how something has depth and dimension. How an object is lit and casts shadows within its environment is the key to showing its form.

As mentioned before, we could go on, but hopefully, this is a useful introduction to the black and white world. ■


BEFORE



This male portrait was shot with a 24-105mm f/4 lens. It was shot in colour and in Raw format, but was converted to black and white using a basic mono conversion technique. It was sharpened and some contrast added to boost the texture of the model's skin.



This image was shot with a 50mm f/1.8 lens with a wide aperture to make sure the background wasn't a distraction. This black and white conversion was done with heavy contrast. No sharpening was applied to keep the skin soft and grain added for a 60's retro feel.

Mono landscapes

Some essential things to consider before you step out into the world

Although there is no real right and wrong to shooting landscapes, there are a few tips that can elevate your shots and have them stand out against the general background noise of countless dull shots. First of all, take time to research your possible shooting destination if you have not been there before. Just Googling the location you want to shoot will call up all sorts of information. Most of it may be useless to you, but you can guarantee that there will be examples of other photographs taken there. The experiences of other photographers in this location will give you the heads-up as to whether it is an easy or difficult place to reach. There may be tips concerning local by-laws and the best nearby parking spots etc.

There are also apps available that can tell you where the sun will be at any point on any given day. These apps can overlay information on a map of your given destination, showing where the sun will rise and fall, and where it will track through the sky on whichever day you choose. This is great for working out what time is best for you to shoot in the location that you are currently researching.

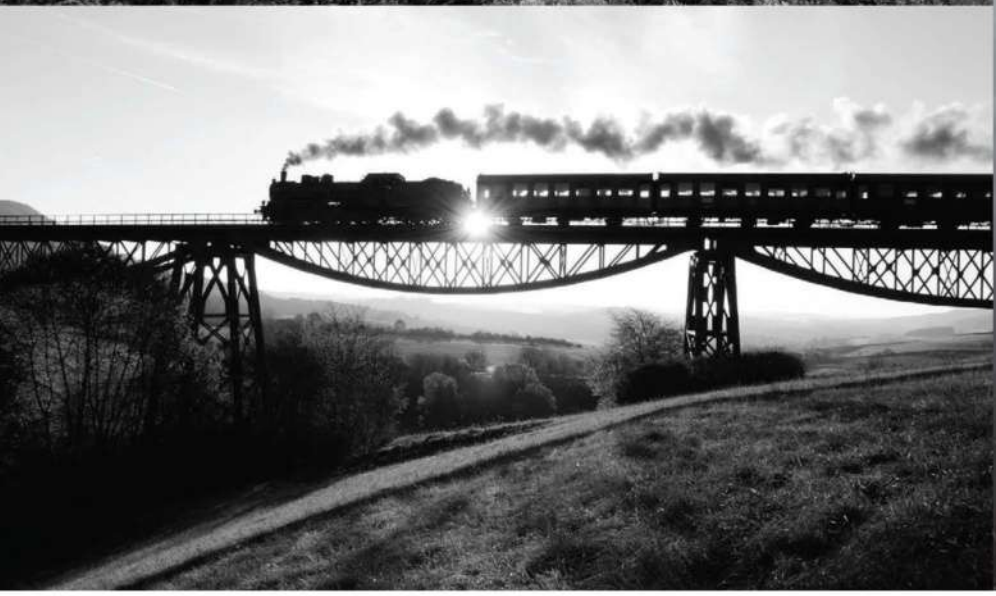
Make sure you dress for the conditions you are shooting in. If you are going to be on rough terrain, then sturdy shoes are essential. A sprained ankle, miles from anywhere, could be very unpleasant. Make sure someone knows you are out there and that you have your phone with you at all times. You never know.

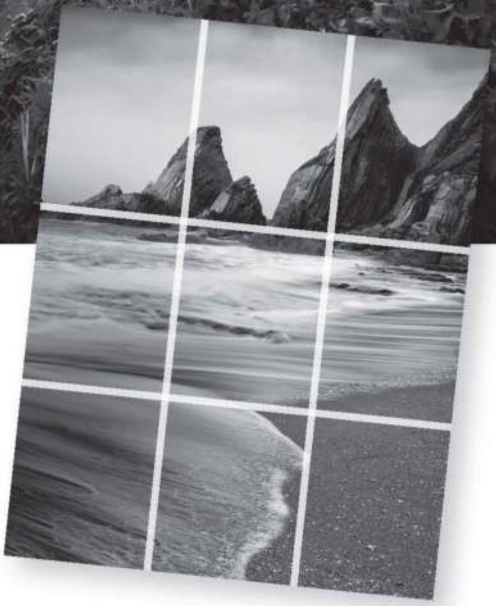
Gear up for landscapes

A tripod is a must for landscape work. You may be working in low light conditions and handheld shots are not going to yield sharp images. You might also want longer exposure times to render water soft and misty, or show clouds moving in the shot over a number of seconds for added drama. There are plenty of strong, lightweight tripods to choose from that won't be a chore to carry with you on your shoot. Couple a cable release with it and you are taking big steps in reducing any unwanted camera shake and vibration.

Think about investing in some filters. A circular polariser is very useful. It can boost the contrast in blue skies and it is very useful for reducing or even eliminating reflections in water. Additionally, manufacturers such as Cokin and Lee produce a wide variety of filter types; but if you are serious about your landscape photography, probably the single best one you could purchase is a neutral density graduated filter. If you are shooting a scene where there is a large difference in the tonal values between your land and a bright sky, the ND grad will help stop those skies from burning out.

Don't always assume that your landscape has to be shot with the widest lens you have. Sometimes a longer focal length is great for picking out distant details that a wide-angle lens could not. Zoom lenses are also a good choice as they allow you to zoom in and out, allowing you to crop your shots and alter the composition





This is how the rule of thirds has been applied to the shot. The sea and rock elements fall along the horizontal divisions and the rock sits on the intersection of two lines in the top right corner of the image.

> *"Composition is a very subjective thing. What looks good to your eye may look odd to someone else."*

without having to move large distances. Don't forget to shoot in portrait orientation too. Keep on experimenting.

Creative composition

Composition is a very subjective thing. What looks good to your eye may look odd to someone else. If nothing else, keep the 'rule of thirds' as your main compositional tool. Imagine that your frame is split by lines into thirds, both vertically and horizontally. Placing an object of interest at one of the points where these lines would intersect means you are adhering to the rule, and this will help bring balance to your shot. That's not to say you must always shoot by this rule. Rules can be broken, so it's up to you. Don't be afraid to try out different ideas. They may not always work, but have fun trying.

More often than not, many photographers will want their scene to be as sharp as possible from front to back. This ensures that a foreground object like a tree, and a distant object such as a mountain, are both as sharp as possible. This is where depth of field comes into play. At large apertures such as f/2.8, the area of sharp focus in front and behind the point of focus will be relatively small. If you use a much smaller aperture such as f/22, that 'zone' of sharp focus is much greater. As a very rough and general guide, if you focus on a point about one third of the distance into your scene, you are giving yourself the best chance of maximising the depth of field available.

Long exposures

Consider using longer exposures in your landscape shots. Photographers often employ exposures that last seconds, or even tens of seconds, to show clouds streaking across the sky rather than looking static and puffy. The classic is to shoot moving water using long exposures. Waves crashing against a shore with an exposure of one or two seconds show the water as a dynamic and powerful fluid; the same scene shot with a much longer exposure will turn the water to a misty, milky fog. It is safe to say that your tripod is the key to the success of these shots.

One golden rule that should not be broken is that you must shoot in Raw format. Raw gives you unprocessed and uncompressed image data to work with, in order to wring every bit of detail from each of your shots. The applications that are now available to process Raw images are extremely sophisticated and are an essential part of the workflow.

More important than any of the points raised here, be sure that you enjoy what you are doing. If you are loving the shots you take, it will show in the final result. ■

> *“There are a few basics to be aware of, but it’s nothing that a photographer of any skill level can’t handle.”*

Taking photos of landscapes is one thing, but when you decide it’s time to get involved in portrait photography, it can seem quite a daunting prospect. You might imagine it requires armfuls of expensive equipment and lots of lighting gear. Don’t worry; there are a few simple things that you can try to see if portrait work is for you. Indoor natural light is certainly a great and easy way to dip your toe into the portrait world. There are a few basics to be aware of, but it’s nothing that a photographer of any skill level can’t handle. ■

Natural light portraits
How it's done

The camera

For most applications, the camera can be anything from a simple point and shoot up to a pro level DSLR. One consideration, that elevates portrait shots from the ordinary, is lens choice. A lens that has a large maximum aperture will give you two major benefits: Firstly, since you are in an indoor, natural light environment, there may not be as much light as you would wish and your shutter speeds may be quite low. You can boost the ISO of course, but you want to retain as much quality in your shot as you can. A wider aperture allows more light to enter the camera, giving you the chance to use higher shutter speeds and therefore reduce the risk of camera shake. The second benefit is more of an aesthetic one. Large apertures also have very shallow depth of field. This fact may be beneficial, when shooting a portrait, if you have a subject with a distracting background. Once focused on your subject, the background will be blurry and less intrusive.

The light

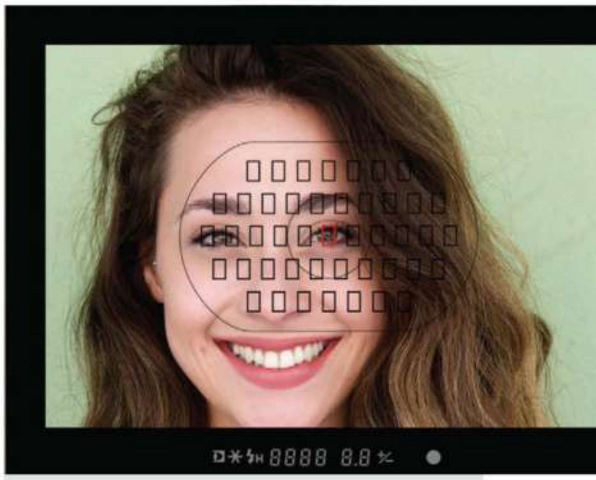
Natural light entering a room is your primary source of illumination. It can be as simple as a window, roof light, bay window, conservatory, or doorway. If the light source is near a plain wall then, if you need it, you instantly have a backdrop. If it is a harsh, sunny day and the light entering the room is very strong and directional, you can always hang a white bed sheet over the window to act as a diffuser and take some of the harshness out of the shadows.

Settings

Longer focal lengths are more flattering for portraits. Using a wide-angle lens will distort their proportions and make them look like they are reflected in the back of a spoon. Try focal lengths around 50mm-100mm. It is best to begin by setting the camera to your lens' widest aperture. Focusing is key to a good portrait. Always make sure you have the eyes in sharp focus. If your subject is turned to you at an angle, make sure the closest eye is the one in focus. Aperture priority works well in this instance, although you can go to manual mode if you are feeling more confident.

Bounce

A large piece of white card is a very cheap method of creating a reflector. You can use defectors to bounce light onto your subject and create some extra fill light that can, if the light is too harsh, illuminate shadows. If you also happen to have some lamps in the room, you can employ them as simple secondary light sources. A bed sheet hung in from of them can soften their output if required.



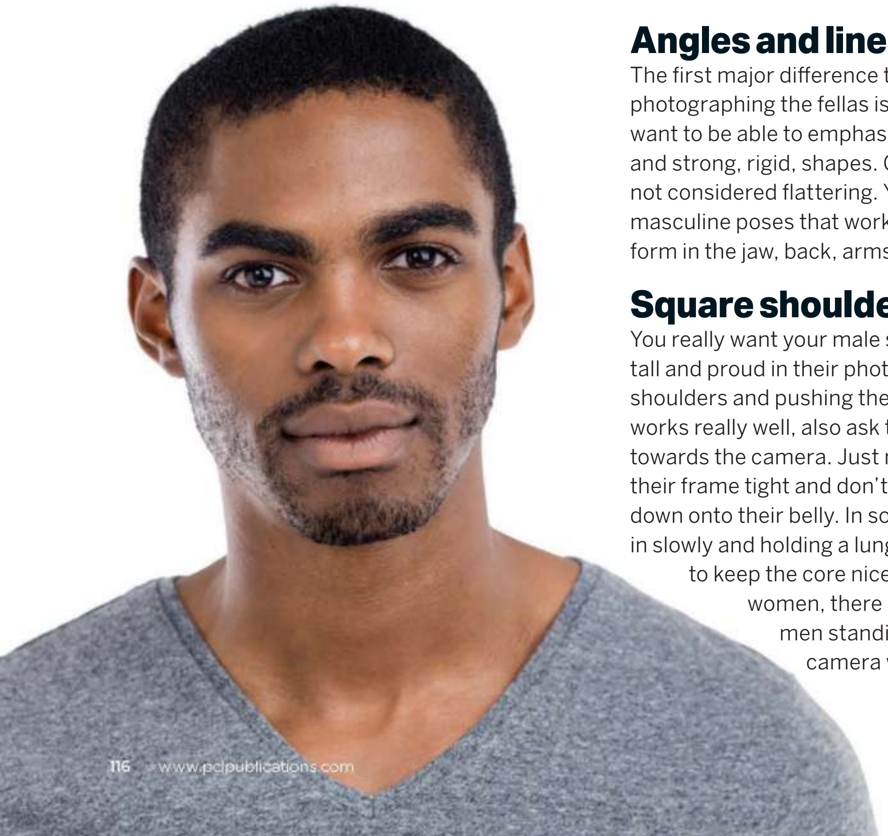
The shot

Placing your subject relative to the light source is a creative decision, but start by trying shots where the subject is square on to the light. This will provide even illumination that keeps harsh shadows away. Avoid the light source dropping below their head level. Lighting from below is best used only in horror films! If you pose your subject at an angle to the light, you will start to create shadows that fall across the face away from the light source. This can help make features more three-dimensional. If the shadows are too dark, get some extra light in there by using a white sheet, or card, to bounce light into the dark parts.

Male portraits

How it's done

Since we have just discussed how to photograph women, it seems only right to pass on a few tips about how you can photograph men and produce great portraits. The general rules for men are slightly different in approach than those of women. As with women, if your male subject is not an experienced model, then they are likely to turn to you for guidance and you can help them out by knowing some of the basics and hopefully give them some confidence in front of the camera to get your shots looking next-level awesome. ■



Angles and lines

The first major difference to be aware of when photographing the fellas is that you actually want to be able to emphasise lines, angles and strong, rigid, shapes. Curves on men are not considered flattering. You are looking for masculine poses that work to produce strong form in the jaw, back, arms and legs.

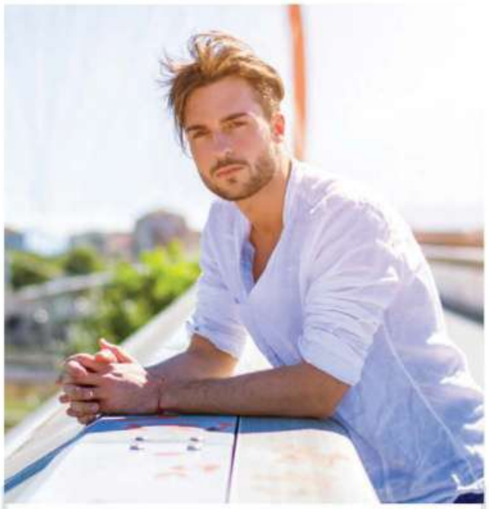
Square shoulders

You really want your male subjects to stand tall and proud in their photos. Squaring the shoulders and pushing their frame up a little works really well, also ask them to lean in slightly towards the camera. Just make sure they keep their frame tight and don't slump their ribcage down onto their belly. In some cases, breathing in slowly and holding a lungful of air helps to keep the core nice and tight. Unlike women, there is no real issue with men standing square to the camera with a strong pose. As with everything though, experiment with poses in which both you and your subject are keen.

> *"The general rules for men are slightly different in approach than those of women."*

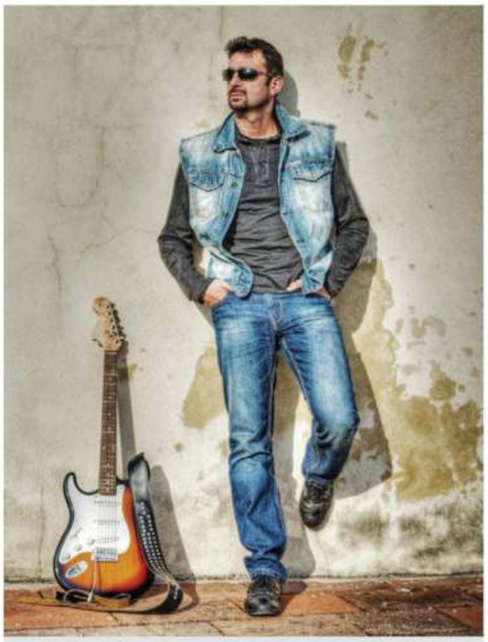
Double chin

For men, the double chin can be a very unflattering look. When posing your subject, make sure they push their chin and jaw forward and lift the head slightly. As with the ladies, it helps avoid neck wrinkles. A head down pose with eyes looking up at camera will result in that extra chin if they bend their neck and collapse their jaw too far onto their chest.



The lean

For subjects that are a bit awkward and finding it hard to relax, getting them to lean on something can often help. A railing, wall, or counter top in a bar, it doesn't matter. Get them to lean on it and one leg will naturally want to bend a bit, or actually cross one leg over the other. The other hand can go in a pocket if needed, or rest over the top of the arm that's leaning on the available surface.

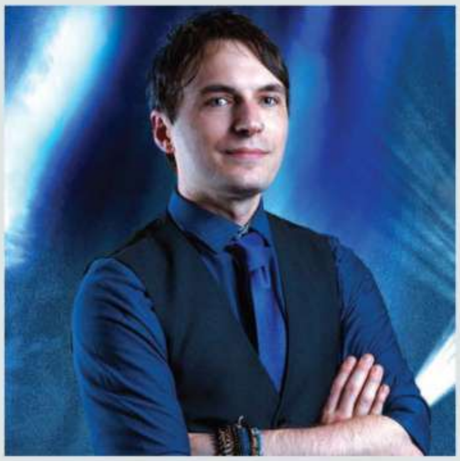


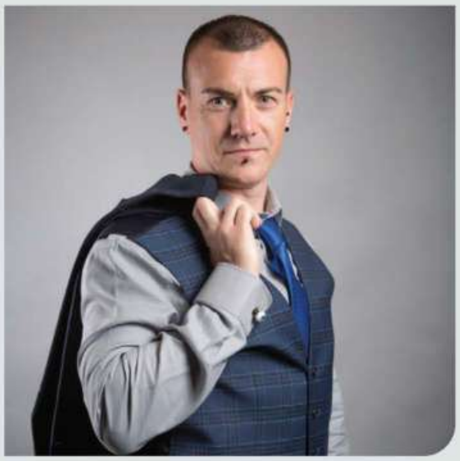
Legs

With legs, the rules are generally the same as with women. Try to avoid very straight legs. The leg furthest from camera is usually the one you would ask the model to put their weight on. The leg closest to camera can be more relaxed and he can bend it more. In the fashion industry, that rule for men and women is often broken with the models standing in almost superhero-type poses. For the rest of us mere mortals though, looking relaxed is the way to go.

At ease

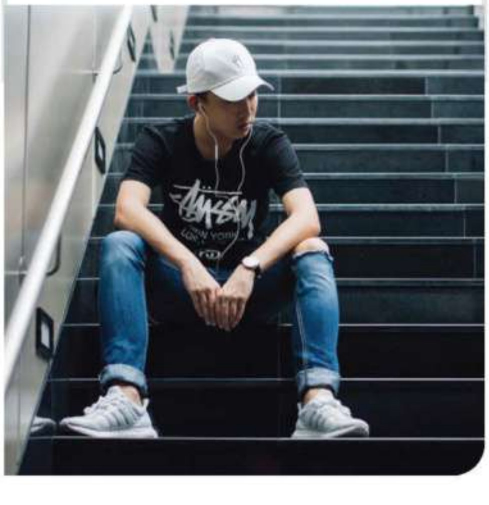
For a lot of inexperienced models, knowing what to do with their hands is a skill best learned early on. For men, the correct placement of hands can show a sense of confidence. For example, asking a man to fold his arms over his chest or put his hands in his pockets is quite a natural thing. It looks great for men in a photo and will usually help relax your subject. The hands themselves need to be watched; stiff hands betray a nervous model. The odd prop, such as a jacket thrown over the shoulder, is also a useful device for more natural posing.





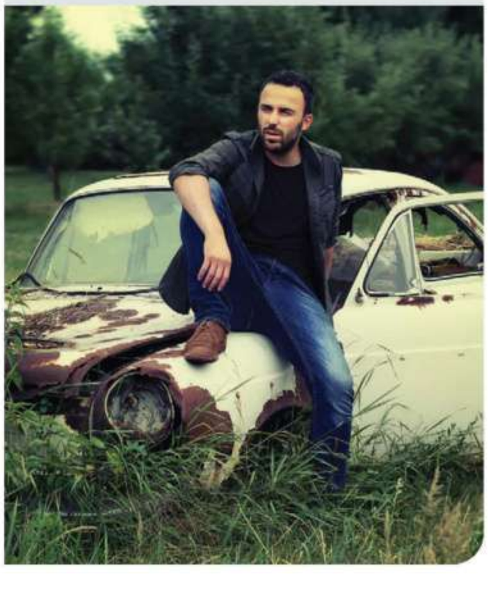
Sit down

Sitting is another natural and relaxing pose for a man. Hands can rest in the lap if needed and you can cross their legs. If they are sitting on stairs, they can draw their legs up to a level where they can lean forward and place one or both arms on the tops of their legs. Hands can be folded together or one hand can rest in the lap. They can also lean in towards the camera. It looks a confident pose and is often seen in many lifestyle photos and clothing/fashion images.



One up, one down

In addition to the sitting poses already mentioned, men can also do the one leg up and one leg down pose. Depending on how far up the bent leg is drawn, an arm can be draped on top of it. If you also have a man standing and leaning his back onto a wall, one leg can be drawn up into a bent position with his foot flat against the wall.



Female portraits

How it's done

As a photographer, if you are ever required to create portraits of women, there are a number of key factors that are worth bearing in mind. If both you, as the photographer and your subject, as the model are not experienced professionals, then knowing how to pose for a photograph is the thing that will make or break your image. All the best lighting, exposure and composition in the world will not save the image if your model looks awkward and unhappy. Here then are a few helpful hints to get your female portraits looking professional. ■

The curve

It is considered flattering for a subject to angle their body away from the camera, rather than square on to it. It creates more visual curves and shapes, complementing the model. It certainly helps the subject to look less stiff and awkward and less like they're posing for a police mug-shot. Try and avoid any part of the body creating a straight line; straight lines will make your model look rigid and uncomfortable.

Relax

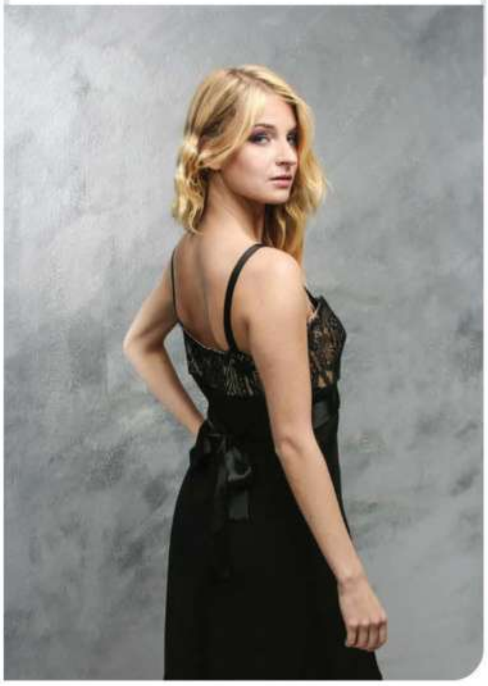
Posing arms and hands can be a tricky one for an inexperienced model. Basically, arms and hands need to be kept relaxed. No fists, as this can create tension in the hands and arms. The arms themselves should be kept slightly away from the body to try and avoid the 'soldier at attention' stance, as well as keeping the pose relaxed and natural. Pushing hands forward towards the camera can make them appear larger in relation to the rest of the body, so watch out for that.

The neck

The neck of your subject is a key body part that can affect the shot quite considerably. If they don't stretch out their neck slightly and draw their head forward, there are chances you will create unwanted shadows and unsightly creases in the neck. Be aware of asking your model to turn their necks in such a way that generate too many of these wrinkles from neck to shoulder.

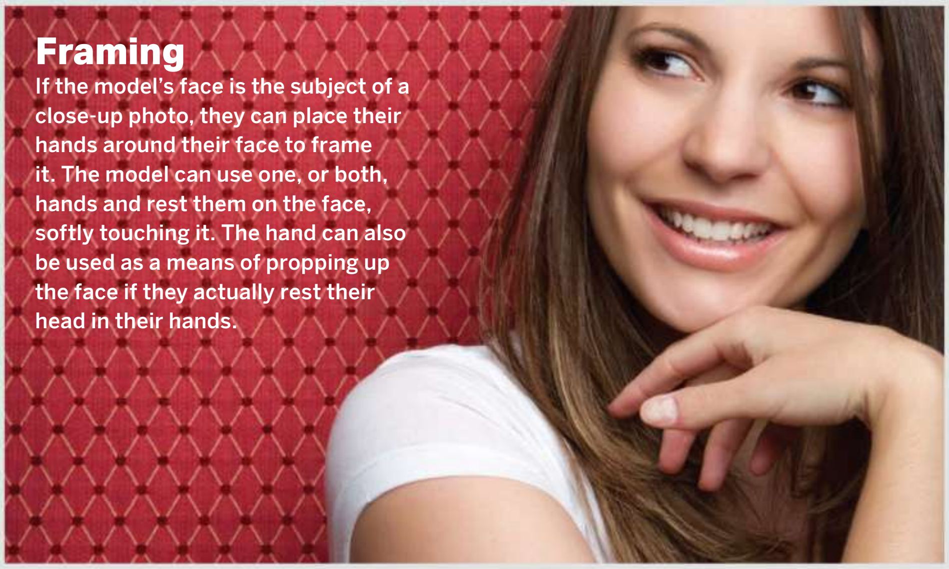
Stand up

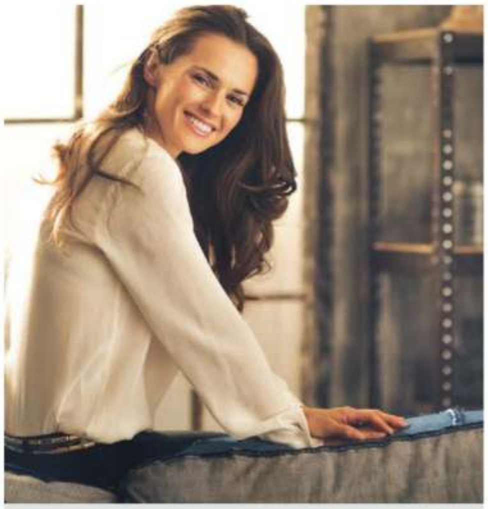
In a standing pose, legs should generally not be held straight. For a woman, the classic standing pose is to place more weight on the back leg, while bending the front leg and pointing the toe at the camera. Crossing one leg in front of the other can also create some visual lines that are flattering and pleasing to the eye.



Framing

If the model's face is the subject of a close-up photo, they can place their hands around their face to frame it. The model can use one, or both, hands and rest them on the face, softly touching it. The hand can also be used as a means of propping up the face if they actually rest their head in their hands.





Look back

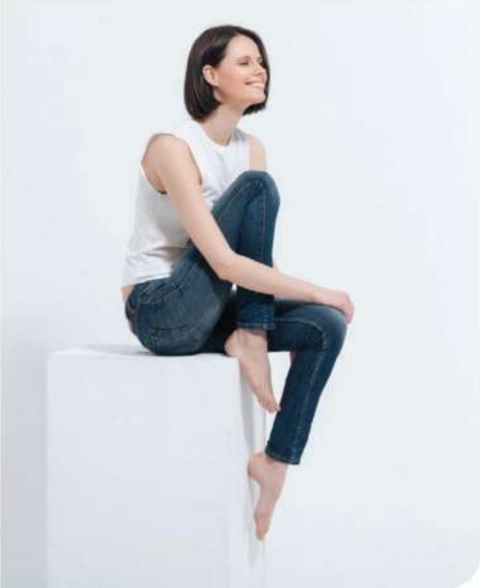
The over the shoulder look is another classic pose that is quite easy for an inexperienced model to achieve. These images are very flattering and can also look quite enigmatic and classy. They can engage the camera with eye contact, or look away in different directions. Just watch out for neck wrinkles again. Don't ask the model to over rotate their head or you run the risk of looking like something out of an Exorcist film!

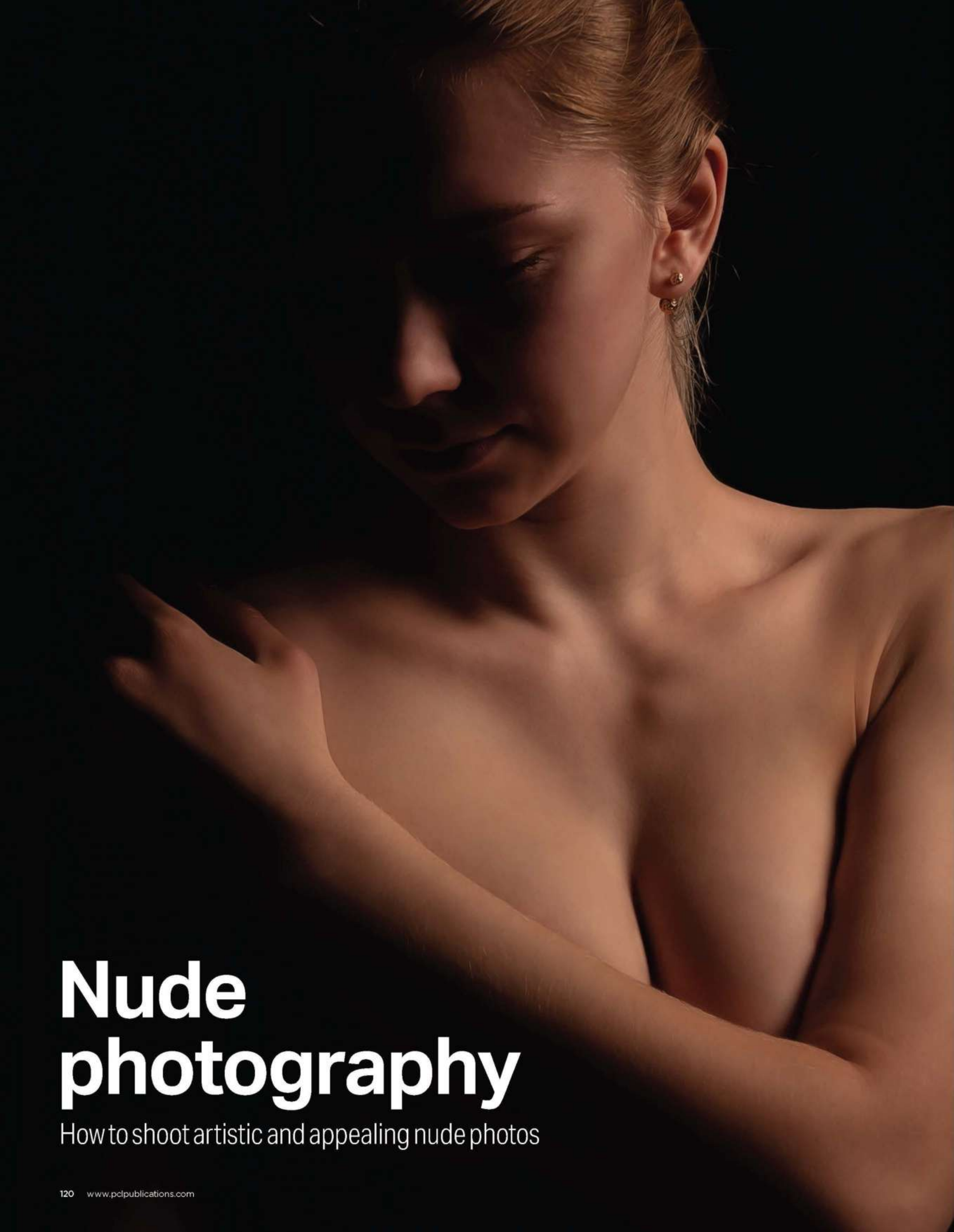
Lying down

For a little more intimacy in your female portraits, you can ask the model to lie down. They can choose either to look directly at camera, for more confident looking photos, or perhaps look away or close their eyes for more wistful images. If you get them to lie with their body angling away from the camera, then that also has a flattering effect.

Take a seat

If you want your model seated for some photos, try to avoid a rigid, straight back. Remember; curves work. Ask her to bend her back slightly to either open out the pose, or close it in. Keeping one leg bent is another key factor in making seated poses work. The bent leg can also provide a support on which to rest a hand or arm.





Nude photography

How to shoot artistic and appealing nude photos

> *"Since the dawn of the art form, many famous photographers have shot nude studies, and if it's something you're interested in exploring, there is no reason that you can't attempt it too."*

When you think of nude photography, chances are you're going to fall into one of two categories. There are those that consider nudes controversial and vulgar, then there are others who just see it as a creative representation of the human form. There is no doubt that if handled with respect and care to the subject matter, nude photography can yield amazing images. Of course, it is sensitive in its nature, and attention must be paid in order that it not stray into the pornographic. Since the dawn of the art form, many famous photographers have shot nude studies, and if it's something you're interested in exploring, there is no reason that you can't attempt it too. We have, in no particular order, a series of guides that can help you create artistic and tasteful nudes.

Lenses

Many photographers may have a say about what lens is best for a nude study. It obviously comes down to the photographer, the subject, and the scene. As a good starting point, the kinds of lenses you might use for a portrait shoot are also very valid for this subject too. Lenses with focal lengths of 35mm, 50mm, 85mm and possibly 100mm are considered your go to guys for this kind of work. Generally, if you want distortion-free shots of your subject, then 50mm is definitely a good place to start. Bear in mind that as you stray further into wide-angle territory, such as 24mm or shorter, shooting close up will result in your subject suffering from the greater barrel distortion present in these lenses. It is always a good idea to have at least one prime lens, with a large maximum aperture, in your kit bag. The benefits it yields are; out of focus backgrounds to avoid distractions, and faster shutter speeds if shooting in low light conditions.

As a side note, the camera you use is probably less important than the lens. A decent 24MP DSLR, with the ability to swap out lenses, means you can be creative with your shooting. If it can handle higher ISO with less noise, that can be a bonus, especially if you are shooting in dim natural light.

Light

If you are not in possession of flashguns or studio strobes, don't worry. Some of the best shots can be created with some careful use of natural light. The light coming into the room from a nearby window, diffused slightly by a net curtain, can create soft, flattering shadows. A low evening sun, with light slanting in through a window fitted with blinds, will cast patterns and shadows on your subject's body, accentuating their shape. By placing them directly in front of the window, and metering for the brightest highlights, you can drop them out to a silhouette for a very strong effect. If you can, black out the room, then you have the option to use artificial lights for more targeted effects. A simple desk lamp can be used as a rim light for very subtle and striking results. The main thing to remember is how you use light to its best advantage. Keep in mind you are using it to deliberately create shadows and highlights that enhance the shape and form of the body.

As examples like this show, you don't need a modern studio full of fancy gear. A simple floor space, a black drape, or a simple coloured wall is all you need.

Simply lighting your subject with gelled flashes creates a stunning nude study. Using props can also work well and create cool, funny, serious, and sensuous images that are a reflection of your own creative vision.

Your model

Your first port of call is to commission a model for your shoot. To avoid any awkwardness later on, it is essential that the nature and intention of the shoot is clear. Your subject is going to be naked in your presence and you must be the very paragon of respect and consideration. It makes a lot of sense to meet up prior to the shoot and discuss what is required of them, and to go through the kinds of poses and locations they may be required to interact with. This way, you can both get to know each other a little better, helping eliminate any snags on the day of the shoot. Keep up a good dialogue with your model during the shoot, and share with them the images you've taken. Showing them what you've shot helps them see your vision and lets them know they're doing ok. This should make them more confident in both your ability as a photographer and theirs as a model.

One key point to make is that you never touch the model, unless permission has been given. This is a sensitive shoot and just reaching out to adjust an arm or a leg is not permissible unless they have consented. Alternatively, you can try mirroring the pose or indicating what part of their body needs moving. If you have access to examples on a mobile device or tablet, then show them that instead. This last point is very helpful for models who have just started out and require hints and advice about posing.

Be minimal

Many of the best nude photos are examples of minimalism. Don't worry if you don't have a state-of-the art studio, a blank wall or floor is as good a canvas as any. If you are shooting in a space at home and struggling to clear enough wall space, you can always purchase a cheap roll of photographic backdrop paper, anywhere up to 3m wide. Choose a neutral colour and you have an instant mini studio.

If you have white walls, and a couple of powerful flashes, you can shoot high-key, where the image is very bright, even overexposed, and there is little in the way of shadow detail. Alternatively, you can go the other way and choose a low-key photographic approach. Using a dark background, or blacked out room, there is very little highlight detail and much of the subject is in shadow. A black velvet backdrop is an ideal method for producing a perfect black background. You can also use a black paper backdrop, but watch out for any unwanted light spilling onto the paper and reflecting back.

Using props

With nude photography, what is hidden is often as important as what is seen. Nudes do not always have to be fully naked. Composition can be greatly enhanced with the inclusion of a prop. A simple linen sheet draped across the figure's intimate areas can add a certain frisson to the image. A model, posed in a large wingback chair, or partially obscured by

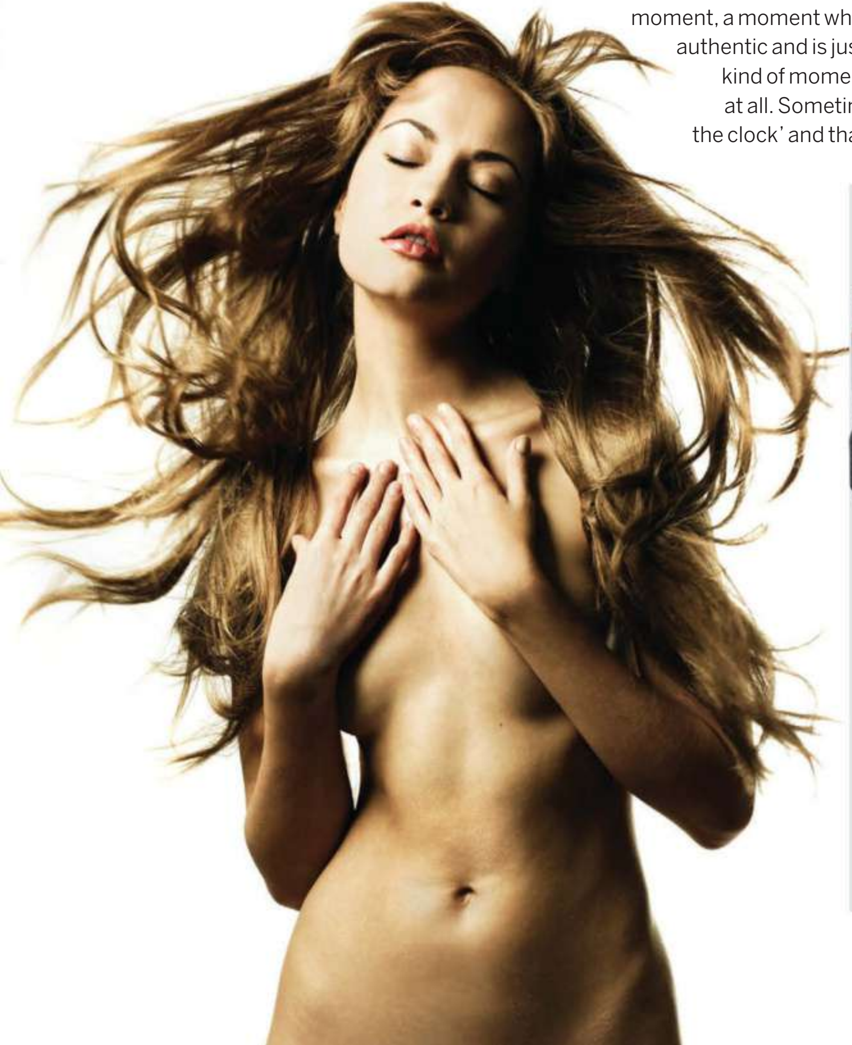
Many fine art nude images have been specifically shot for conversion to black and white.

a wall or curtain, can elevate the shot in stunning ways. If used with care, and in appropriate ways, you can use anything as a prop. A sunflower, a balloon, a musical instrument, a bunch of peacock feathers, anything is fair game.

Posing your model

If they have not shot this kind of thing before it can be a challenge, for both model and photographer. There is any number of simple, but classic, poses that professional models will adopt automatically. Things such as the arched back with hands in hair pose, chilled seated pose with one knee bent and hand in hair. Then there is the lying on the bed pose with one leg drawn up and eyes cast down. Add to that the simple touch, with the lips close up, or the casual covering of the intimate areas with their hands.

You can easily find many posing guides online, but be aware that sometimes less is more. A good, natural, nude photo can also capture an imperfect moment, a moment where the subject looks authentic and is just being themselves. The kind of moment that does not look posed at all. Sometimes a model can just be 'off the clock' and that is worth remembering.



THE LENS

Prime lenses, such as the Canon 85mm f/1.4 L, is an example of a professional portrait lense within the focal lengths preferred by photographers for portrait work. Zoom lenses are very capable too, but generally do not offer such wide maximum apertures.

Colour and more

Think about the use of body paints, oils, powders, even flour and bunches of flowers to add a colourful kick to your shots. Then there's the option of using lighting for a fluorescent effect by lighting your subject with two flashes, each gelled with complimentary colours. One side could be lit green and the other red. Using lights and gels gives you a creative palette of colours to really make your nudes explode with colour.

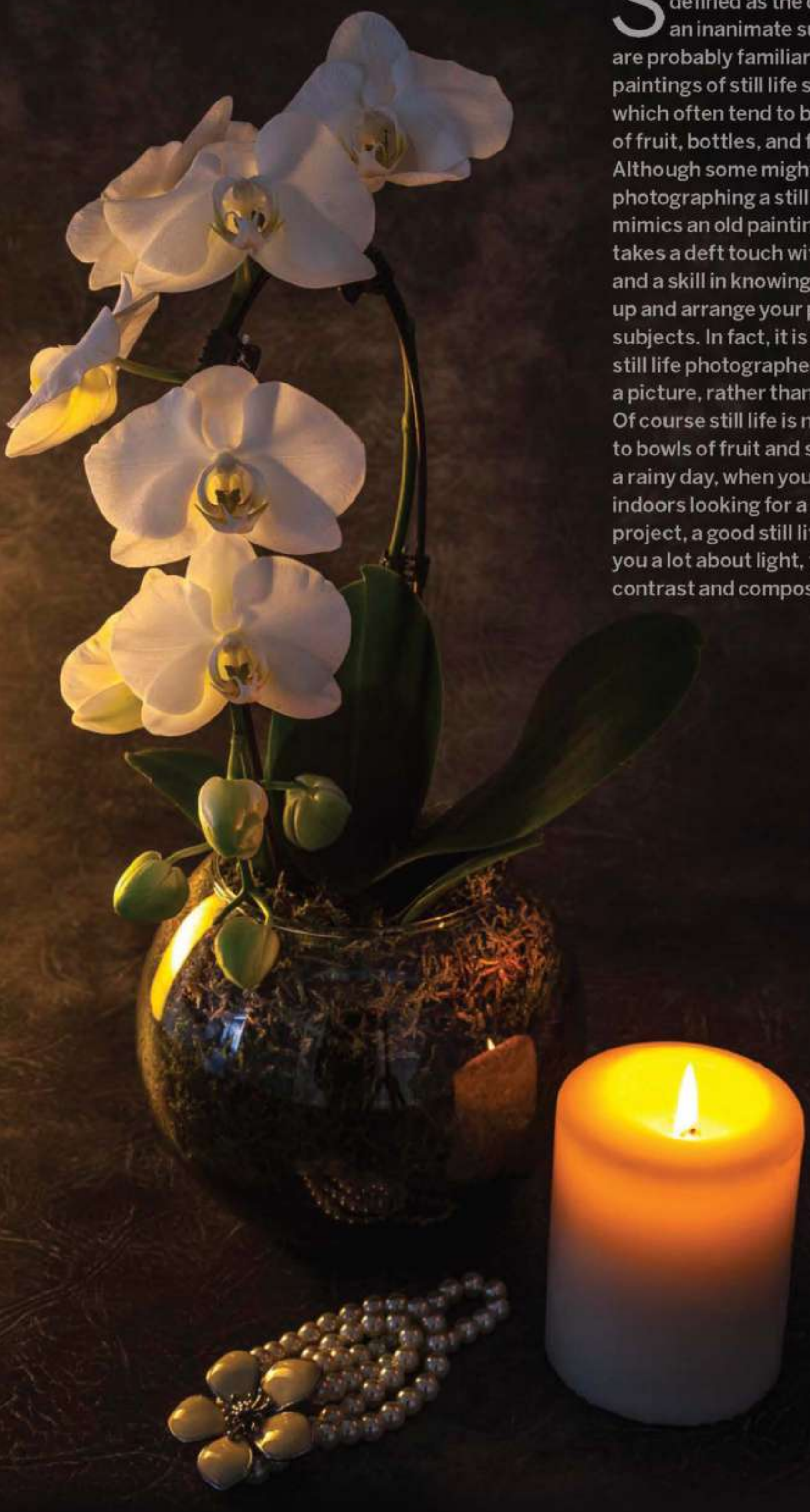
> *"With nude photography, what is hidden is often as important as what is seen. Nudes do not always have to be fully naked."*

Then there is always the absence of colour to think about. Many fine art nudes have been shot with the express purpose of converting them to black and white. In monotone, you are relying solely on the shapes, forms, and textures of the nude to catch the eye. This is where careful attention to the use of highlights and shadows is essential. Black and white nudes often benefit from being as simple as possible in their composition. In many cases, photographers have used macro lenses and shot parts of the body in extreme close up with extraordinary results.

Nude photography is an amazing and artistic topic for any photographer to try. Treat it with respect and you will have some memorable images to add to your portfolio. ■

Still life shoots

Sounds simple, but still life is a demanding art form



Still life photography is defined as the depiction of an inanimate subject. You are probably familiar with classic paintings of still life subjects which often tend to be bowls of fruit, bottles, and flowers. Although some might frown upon photographing a still life that mimics an old painting, it actually takes a deft touch with lighting and a skill in knowing how to set up and arrange your particular subjects. In fact, it is said that a still life photographer is 'making' a picture, rather than 'taking' it. Of course still life is not limited to bowls of fruit and such, but on a rainy day, when you're stuck indoors looking for a photography project, a good still life can teach you a lot about light, texture, contrast and composition.

Creating a still life

For our example, we are going to assume it's a bad weather day, and we'll set something up indoors and create a still life. Where do you start? Well, the best idea is to start with something simple, on a simple background, with simple lighting. Sounds simple, right? It is good practice to begin with an object that is non-reflective, if you're new to still life photography, you don't want the additional headache of dealing with unwanted reflections if you're not able to black the room out. Once you've made your executive decision about the subject you are going to capture, you'll need to build a set for it to inhabit. You'll need a surface or backdrop to create your environment for the subject. It can be as simple as the surface of a wooden table or a piece of fabric, cloth or canvas.

Set the scene

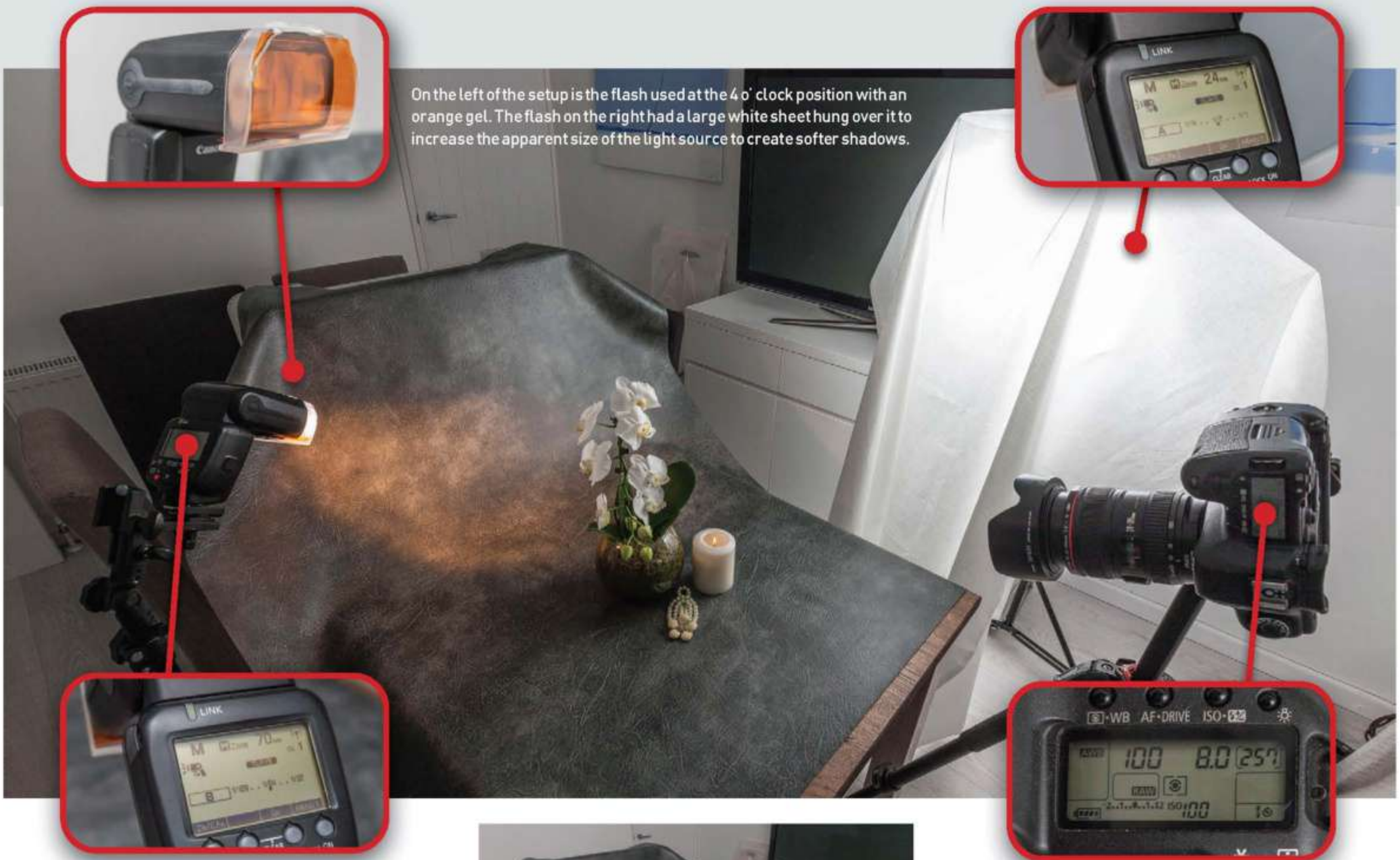
Light backgrounds have a light and pleasant mood, whereas dark backgrounds are more dramatic. It is generally held that the background colour should be of similar tones and colours as your subject, perhaps just a shade lighter or darker than the main elements. Although that is the rule, you can experiment with colour combinations that suit your taste.

Your subject

With a background set up, it's time to introduce your subjects. The beauty of still life work is that you can shoot literally anything you want. You can amalgamate several disparate elements or harmonise the subjects to your heart's content. There is a quoted maxim that arranging objects in odd numbered groups (1, 3 or 5 etc.) is more harmonious than even numbered groups. However you do it is up to you.

Lighting up time

When you have your background and subjects ready, it's time to introduce light. This can be as simple as arranging your scene next to a window on an overcast day and using the soft natural light. If that is not an option, then there is no reason you couldn't employ a couple of desk lamps as your primary light sources. Bounce the light of a nearby wall or piece of white card to create a much larger softbox effect to reduce the appearance of harsh shadows due to small light sources, or place the lamp a distance behind a white sheet and turn the sheet into your light source. Some white card can also be used as reflectors to bounce a little light back into the scene to reduce the depth of the shadows.



On the left of the setup is the flash used at the 4 o' clock position with an orange gel. The flash on the right had a large white sheet hung over it to increase the apparent size of the light source to create softer shadows.

Getting in the mood

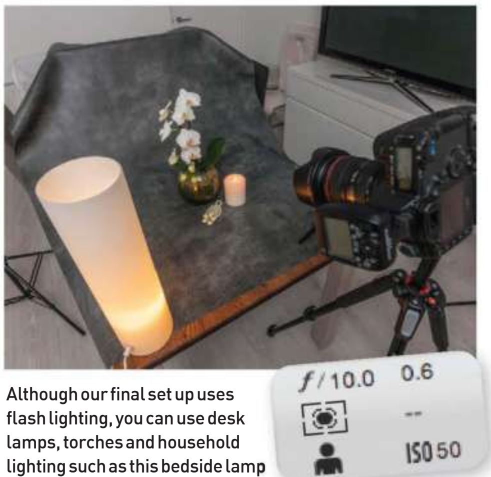
In our example, we were going for a moodier look. Something that looks more like an old 17th century oil painting. In fact, a Google search for 17th century still life paintings will provide you with many inspirational references where you can study how they chose to capture the light in their scene. Our example was set up on the dining room table with curtains drawn to subdue the ambient light, it was the closest we could get to having the room blacked out. A local fabrics shop had a couple of interesting leather-effect sheets you could buy off the roll. We had a meter each of a grey and a brown textured material, ideal for our backdrops.

Lights and camera

We were working with two wirelessly controlled flashes as our primary sources of light. The camera was set up on tripod to avoid camera shake, and a favourite 24-105mm f/4 lens gave us ample compositional and framing scope of our first subject on the grey material which was a house-warming gift, plus a candle and a piece of jewellery. The subjects were arranged and the lights were set. The process began to dial in both camera settings and the power required of the flashes to light the scene.

Settings

We ended up with one flash at 1/2 power shooting through a large white sheet to mimic a window and the second at 1/64 power with an orange gel placed over the flash to cast a warm glow across the back of the scene. The camera was set at a shutter speed of 1/100th of a second, an aperture of f/8.0 and ISO 100. We would have chosen a shutter speed at the camera's x-sync speed of 1/160th of second, but the camera was an older Canon 5DMK2 and the wireless controller was designed for newer Canon cameras such as the 5DMK3 and the 7DMK2. As such, the controller limits how close you can get to the top x-sync speed and will not let you use high-speed sync at all, which is a shame. However, the settings we had were fine for our set up so we could get shooting.



Although our final set up uses flash lighting, you can use desk lamps, torches and household lighting such as this bedside lamp shown on the left and still get a great result as seen in the main picture above.

Shooting the scene

We shot a few frames, tweaked the position of both lights. If you imagine the camera is at the 6 o'clock position, the main flash with the white sheet over it was at the 4 o'clock position and the flash with the orange gel was at the 10 o'clock position, aimed at the grey leather-effect background. This created some nice shadows across the scene and in the petals of the flowers. Try to avoid front-on lighting as it has a tendency to flatten objects out. Shadows help create a sense of depth and give a more 3D quality to your image. The final thing to do was light the candle. Our camera's shutter speed settings were such that enough of the ambient light in the scene could still show up in the shot, so the brightness of the candle flame was not lost each time the flashes fired. A small amount of smoke from the lit candle also showed up very well in the shot, adding to the scene.

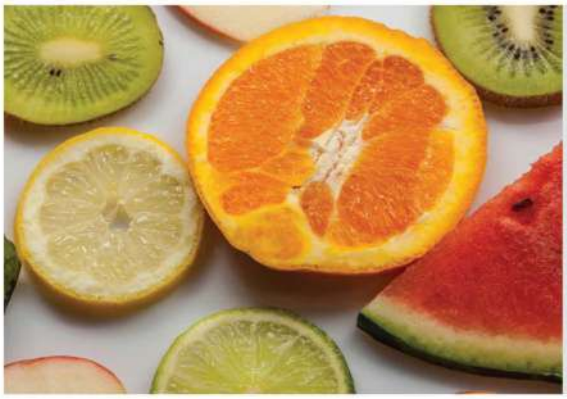
Post processing

All that remained was to download the shots and pick out the favourite one from the shoot. The processing was fairly straightforward. We added sharpening, some saturation, and also a dark vignette to make the edges of the shot darker to add the mood we were seeking to create and we were done. Why not try your hand at still life photography? Still life is a very good exercise in arrangement, composition, and lighting skills, and well worth a go. ■

Food photography

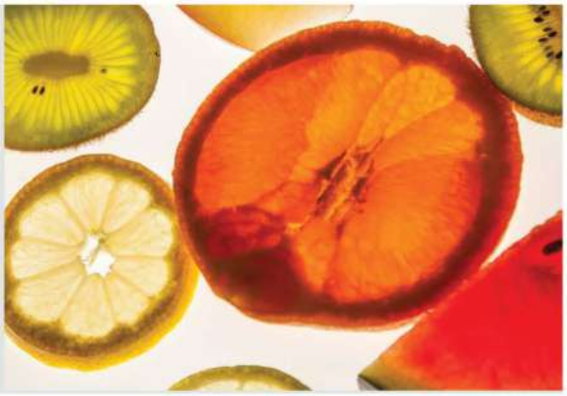
Get arty with some everyday food items

Back in the day, it was always something of a cliché to shoot or paint a bowl of fruit as an indoor still life project. It doesn't have to be that way, especially in the world of digital photography. Using fruit as your still life subject can be given a little twist with this easy to setup tabletop project. Rather than having a bunch of fruit in a bowl, how about something a little more creative? Sliced fruit pieces are a lovely, translucent material, in a range of great colours. All well and good, but what if you shine a strong light through them? Now things get interesting. Suddenly the fruit glows and internal shapes and structure are seen. This is not how you normally see fruit and it sounds like a great image to capture.



SPICE THINGS UP!

These two comparison shots demonstrate the key visual difference that can elevate your food images away from the mundane. The image on the left is lit in a conventional way where the surface of the fruit reflects light as you would expect. The shot on the right is lit from below so now the light is transmitted through the flesh of the fruit and your food is suddenly given a great new look.

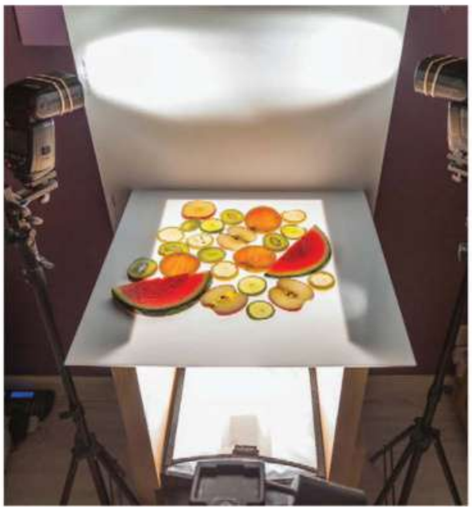


Box clever

To achieve this, you would need a light source of some sort that you can arrange your sliced fruit on. An old-style light box for viewing slides and negatives sounds ideal but they aren't necessarily just lying around your house waiting to be used. As an alternative, you can use a plastic storage box lined inside with some thin white paper that you can shine a powerful torch or lamp through to give you your light box. For our example, we are going to use a 500mm square sheet of white translucent Perspex purchased online quite cheaply.

Setting up

The Perspex is set on the legs of a small overturned table and one flashgun is set underneath to fire upwards into it. A two-flash setup is used above to create some fill light by bouncing off a piece of white card onto the Perspex surface and cast some illumination on the slices of fruit. Our camera and a 24-205mm zoom lens is set up in front and above to capture the image. All flashes are controlled wirelessly but you can easily replace flashes with lamps or powerful led torches.



Slice and dice

Now we need fruit. The citrus and pulpy type fruits are perfect for this kind of shoot. They have great texture and colour. This example employs apples, oranges, lemons, limes, kiwi and water melon. The trick is to slice them nice and thin. Too thick and the light will have trouble passing through them. Slice up as much as you need (or have room for on your home-made light box) and arrange the slices to suit your needs. Our example is just a random assortment laid out on the Perspex sheet.

Dialling it in

Now we need to do a few test shots. After some test firings we have our settings dialled in. Bear in mind, if you are using lamps or torches, your exposure times will differ. Just make sure the most powerful light is the one underneath, shining through the fruit. The flash underneath firing up into the fruit was set on 1/16 power, whilst the two flashes above were each set at 1/64 power. The camera was dialled in manually at ISO 50, aperture f/5.6 and shutter speed 1/160 which is the max sync speed of the camera. This made sure the bottom light is getting through all the fruit slices without over-exposing any of them.

Variety

Now it's just a case of shooting away to your heart's content. Rearrange your fruit as you see fit. Try different angles and zoom levels. In our example, it was quickly realised that having the camera on the tripod was too restricting so we went hand-held with it instead. As the camera settings had given us a shutter speed of 1/160 and the flash duration itself was effectively freezing any movement, we could shoot without worrying about camera shake of motion blur. For a spot of variety, the 24-105mm zoom lens was swapped out for a 100mm f/2.8 macro lens for some close-up detail work. Shooting with the lens at its widest aperture of f/2.8 meant the power of the flashes had to be adjusted. The flash firing upwards was adjusted to 1/32 power and both top flashes were set to 1/128 power.

Pick your fruit

Once the shots were in the bag, they were reviewed and the favourite images processed through a raw editing program, in this case Adobe Camera Raw. There were some interesting compositions that would not look out of place as large format canvas prints. Creative dropping also heightens the abstract feel. In fact, the only problem that remained, was what to do with all the fruit that was left over. Fruit salad anyone? ■

Macro photography

Learn more about this fascinating subject

Macro photography is the capture of tiny objects and organisms on your camera sensor at life-size or greater using a specialist lens or other equipment. In the case of shooting with a full-frame DSLR, a macro image of 1:1 means that if you had an old 35mm negative measuring 36 x 24mm, at its closest focusing distance, you would be able to fill your camera's viewfinder with that negative and photograph it. For a DSLR owner, the most obvious route into macro photography is to buy a macro lens. If budget is no consideration, then full-frame macro lenses with image stabilisation are a great choice. There are more pocket friendly lenses for 100mm full-frame and 40mm crop-sensor models. Macro lenses offer the best optical quality, but if you are on a budget, then there are alternatives that give you the chance to explore the macro world for little outlay.

Close-up filters

As the name suggests, close-up filters are macro filters that you can screw onto the front of your existing lenses. They come in a variety of lens thread sizes and also offer a selection of magnifications. A basic four piece filter set can let you magnify an image by a factor of +1, +2, +4 and +10. Optically, they are not perfect and you will experience a bit of distortion and chromatic aberration where the lens is unable to correctly focus all the colours at the same convergence point. That said, for around £15, it's an inexpensive method of trying it out.

Totally tubular

Another option before taking the plunge and spending out on a macro lens, is to get a set of macro extension tubes. A macro extension tube contains no glass elements and you attach it between your lens and your camera body. This tube mounts the lens further away from the camera sensor. In practical terms, this results in the minimum focusing distance getting smaller, the further the lens moves away from the sensor. Therefore, you can get much closer to

THE MACRO LENS

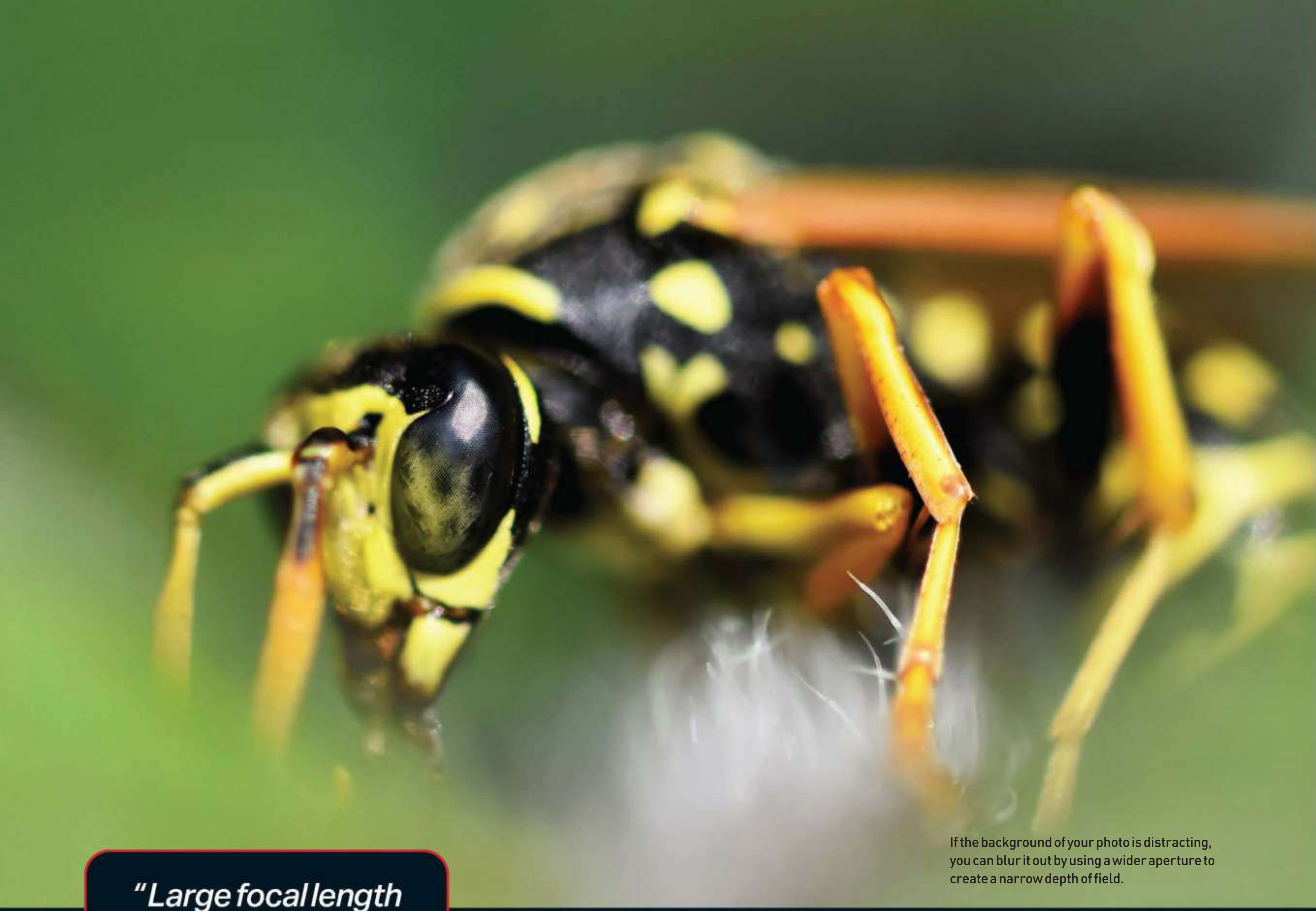
CANON MACRO LENS EF 100mm 1:2.8 L IS USM
Canon
MACRO 100mm
IMAGE STABILIZER
ULTRASONIC

The Canon 100mm f/2.8L macro lens is not cheap but if you are very serious about your macro photography, then you need to be thinking about lenses like this.

your subject and still be able to attain good focus. One thing to note is that these macro extension tubes are more effective with lenses with shorter focal lengths around the 24mm - 50mm area than either very long focal lengths over 200mm or very short focal lengths of 16mm or so. The extension tubes also come in various widths from about 12mm to 36mm.

Macro lenses

There are various macro lenses to suit your pocket from Canon and third party manufacturers such as Sigma. They range from 40mm up to around 200mm versions with the closest focusing distance ranging from 5-6 inches out to about 16 inches. The measure of a 'true' macro lens is its ability to resolve an image on the sensor of your camera that is at least life-size; or a reproduction ratio of 1:1 as we mentioned earlier. Prices will vary of course. The major difference between a 40mm macro and a 200mm (apart from the price) is a greater subject-to-lens distance on the longer focal length lenses. So, your expensive 200mm macro lens lets you keep further away from that pesky butterfly you're trying to photograph without spooking it. ■



If the background of your photo is distracting, you can blur it out by using a wider aperture to create a narrow depth of field.

> *"Large focal length lenses will demand higher shutter speeds and a good tripod."*

Shallow depth of field

Isolate your subject using narrow depth of field

Careful control of depth of field by adjusting aperture and focal length is one of the most striking creative techniques available to the photographer, and you don't need any special equipment to do it, just your camera and a zoom lens.

For this insect image, the photographer has used a 100mm, fast macro lens with a large maximum aperture of f2.8. This has resulted in a narrow depth of field, but by carefully focusing on the creature's body the effect of this narrow plane of focus is to isolate the insect against what could otherwise be a distracting background of the green leaves and grass both behind, and in front of, the subject.

One consideration to bear in mind is that when working with very shallow depth of field, precise focusing is essential. The slightest movement and your subject will shift out of focus, so a good tripod is recommended to eliminate those shot-spoiling effects. ■

BE A MACRO MASTER

The Canon EF 100mm f/2.8 L series macro lens. Perfect for macro shots at 100% magnification, with the added bonus of image stabilisation for more opportunities to shoot handheld. You can shoot as close as 30cm and the f/2.8 aperture enables you to create beautiful background blur in your shots.

The fisheye lens

The right lens for the job

Digital SLR systems offer the greatest versatility of any photographic system, and represent the best compromise between quality and portability. The best CSC systems are still some way behind, but are catching up fast.

There are lenses and other accessories available to suit every type of photography, both amateur and professional. It is worth being aware that top quality Canon DSLR lenses command top prices.

This photographer is using a very specialist lens to get this wide-angle photo of a bride and groom. The extreme nature of the distortion this lens gives you is apparent in the visible curvature of the building and the wide angle of view makes for a creative image.

The kind of lens that can do this is called a fisheye. Whereas most lenses are trying hard to eliminate distortion, the fisheye uses it to its advantage to give you an unparalleled angle of view that can encompass 180°.

In the case of the example lens shown here, the Canon 8-15mm fisheye can actually create a fully circular 360° image at the 8mm end of the zoom range up to a 180° corner to corner image when zoomed to 15mm. Just be prepared to shell out well over £800 for the privilege. ■

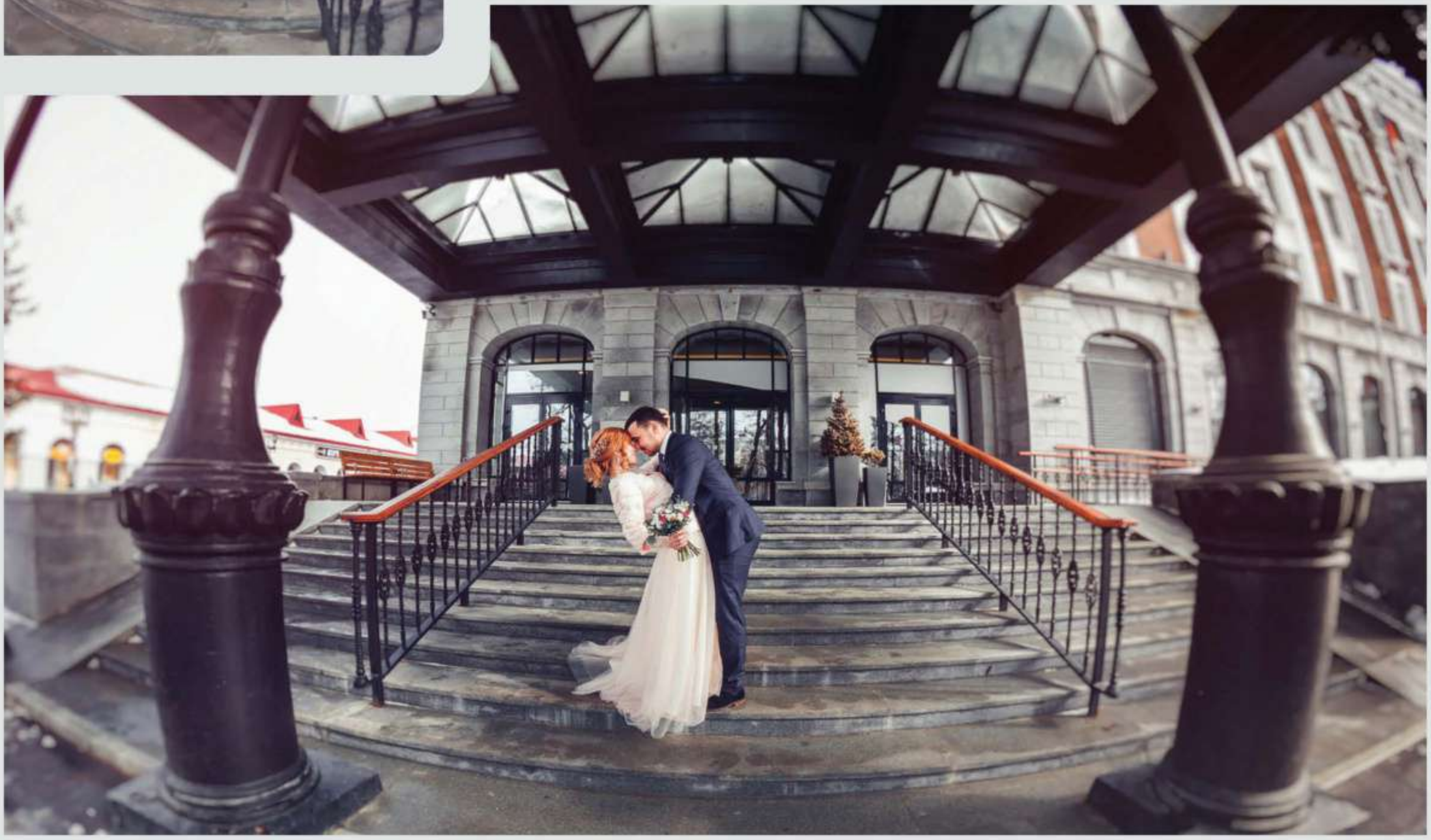
> *"It's important to choose the right lens for the job, but top quality DSLR lenses are very expensive."*

SEE EVERYTHING

CANON FISHEYE ZOOM LENS EF 8-15mm 1:4 USM
Canon
8-15mm
ULTRASONIC
8
10
12
14 15
AF MF

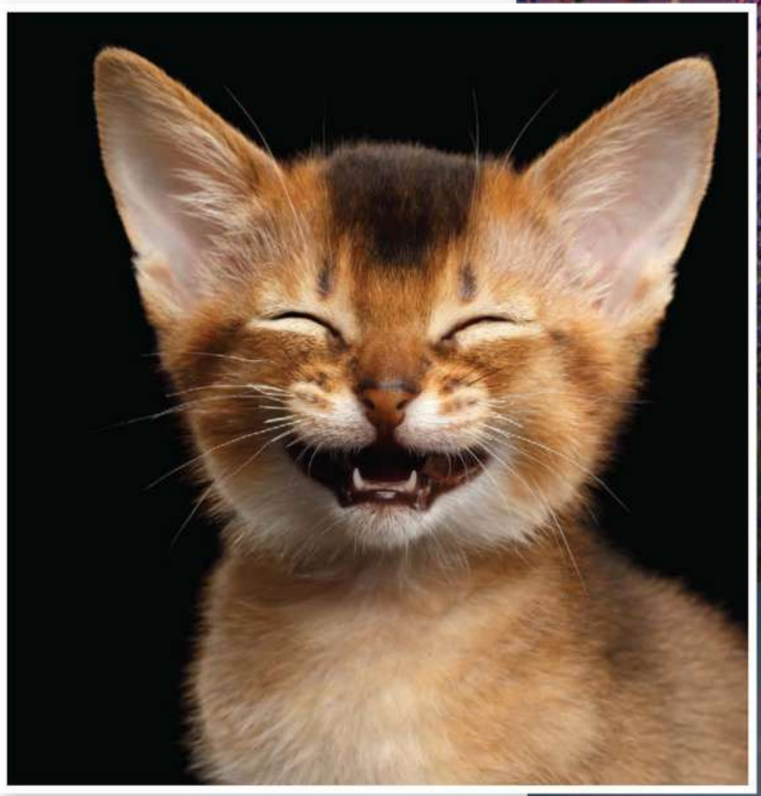
The Canon EF 8-15mm f/4 L USM series fisheye lens. You can choose between a full-frame image or circular fisheye image by using the zoom. Although it is a full-frame lens, if you use it on an APS-C cropped sensor body, it acts like a 12-24mm wide angle zoom which is ideal for landscape photography.

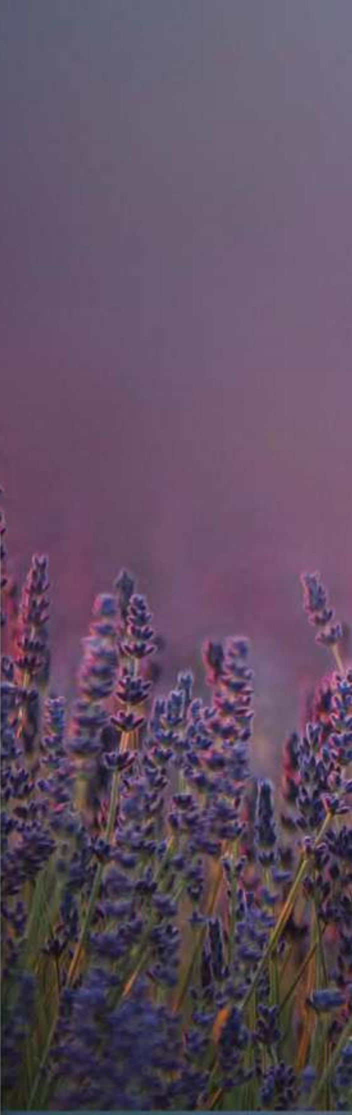
A wedding shoot with a difference. Taken with a 15mm fisheye lens, it provides a different take on wedding photography.



Family pet photography

Time to get our furry friends ready for their close up





We love our pets. In fact for most people they are more than mere pets and become more like family members, the recipients of love, affection and lavish attention. It is likely then that their owners, at some point, are going to want photographs of their furry friends (or scaly, feathery or otherwise). We have a dog, and the number of photos that include him specifically outnumber those of all other family members put together. However, pet photography presents its own special problems. Animals, as we all know, can be unpredictable, lazy, aggressive, hyperactive and downright cute. If you're thinking of trying pet photography, here are a few pointers to get you started.

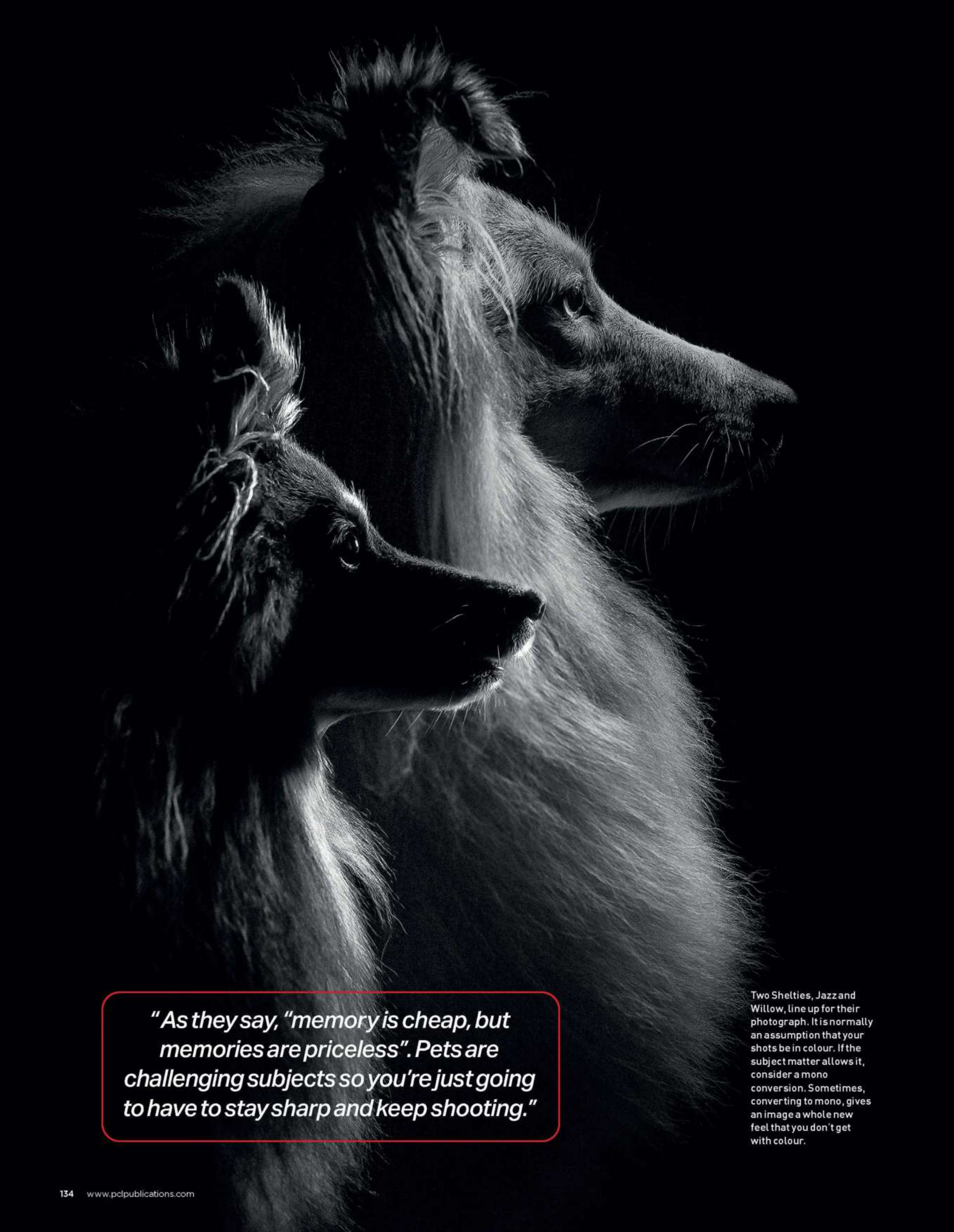
Pet personality profile

You don't need to sit the pet in question on a psychiatrist's couch and ask it to tell you about its mother, but before you start snapping away, find out about your subject's personality and habits. Where does it snooze if the sun is out? What is its favourite toy? Is it lazy, sleepy, or does it like to perch on a garden fence or hide in the grass? Take time to chat with the owner and observe your subject to gain some insight. It's also worth spending a little time getting to know the animal yourself. Cats, dogs, horses, they all have personality, and you need to ensure they are comfortable being around you, and you around them. Scaring a pet right at the outset is not going to make for a particularly happy or productive photo shoot.

Close quarters

Think about getting in close to your subject. If the pet is comfortable with you, and if it isn't too skittish, fill the frame with the pet's face. Get the eyes nice and sharp. Just like humans, this is a natural point of focus, although focusing on the snout of a dog or cat can also make for an interesting image in its own right. A good portrait focuses on the subject and not the background. Yes, there are times when shooting wide can create a great environmental portrait, but make sure you get a good selection of close-ups. A macro lens is perfect for capturing details of the pet, and shooting with a wide aperture keeps any background distractions out of focus.

> "Get the eyes nice and sharp. Just like humans, this is a natural point of focus."



> *“As they say, “memory is cheap, but memories are priceless”. Pets are challenging subjects so you’re just going to have to stay sharp and keep shooting.”*

Two Shelties, Jazz and Willow, line up for their photograph. It is normally an assumption that your shots be in colour. If the subject matter allows it, consider a mono conversion. Sometimes, converting to mono, gives an image a whole new feel that you don’t get with colour.

Capture funny 'moments'.

Keep the eyes nice and sharp.

Get in close.

Keep an eye out for interactions or displays of behaviour.

Try to keep background distractions to a minimum.

Obviously if the animal is not content to keep still for more than a second, this can be a challenge. Keep snapping away; try using your camera's continuous autofocus to track the animal as it moves. If it's proving too difficult, let the animal play a while, and try again. Pets have very short attention spans, so keep it fun, break it up a bit if you have to and always reward and fuss them when they do well.

On the level

Your average dog is a couple of feet tall, cats even smaller. The average adult human is about 5' 7". If you photograph a pet while you're standing up, all you're going to see is the top of their head and their backs, not what you want for a portrait. Get down to their eye level, and see the world from their perspective. If you are able, get lower still. Try pre-focusing your camera and just holding it at ground level so you can look up at the pet. It's worth a try just for a new angle on things.

Lighting

When meeting a new animal, bring a flash and, with the owner's permission, while greeting or playing with the pet, fire a couple of test flashes away from them to see their reaction. In daylight particularly, they never seem to mind the flash at all. If they do mind, then stick with natural light and use a white or silver reflector if you need to fill in any shadow areas. Indoors, a bright continuous light may be preferable. We have a photoflood light that, rather than using old tungsten bulbs, uses three daylight-balanced energy saving bulbs. They are housed in a 22" reflector that you can cover with a diffuser to soften the light if need be. You can also try placing your subject near a window to use the natural light. If we are using flash with a willing subject then we invariably use cross-lighting, avoiding shooting a flash directly at them.

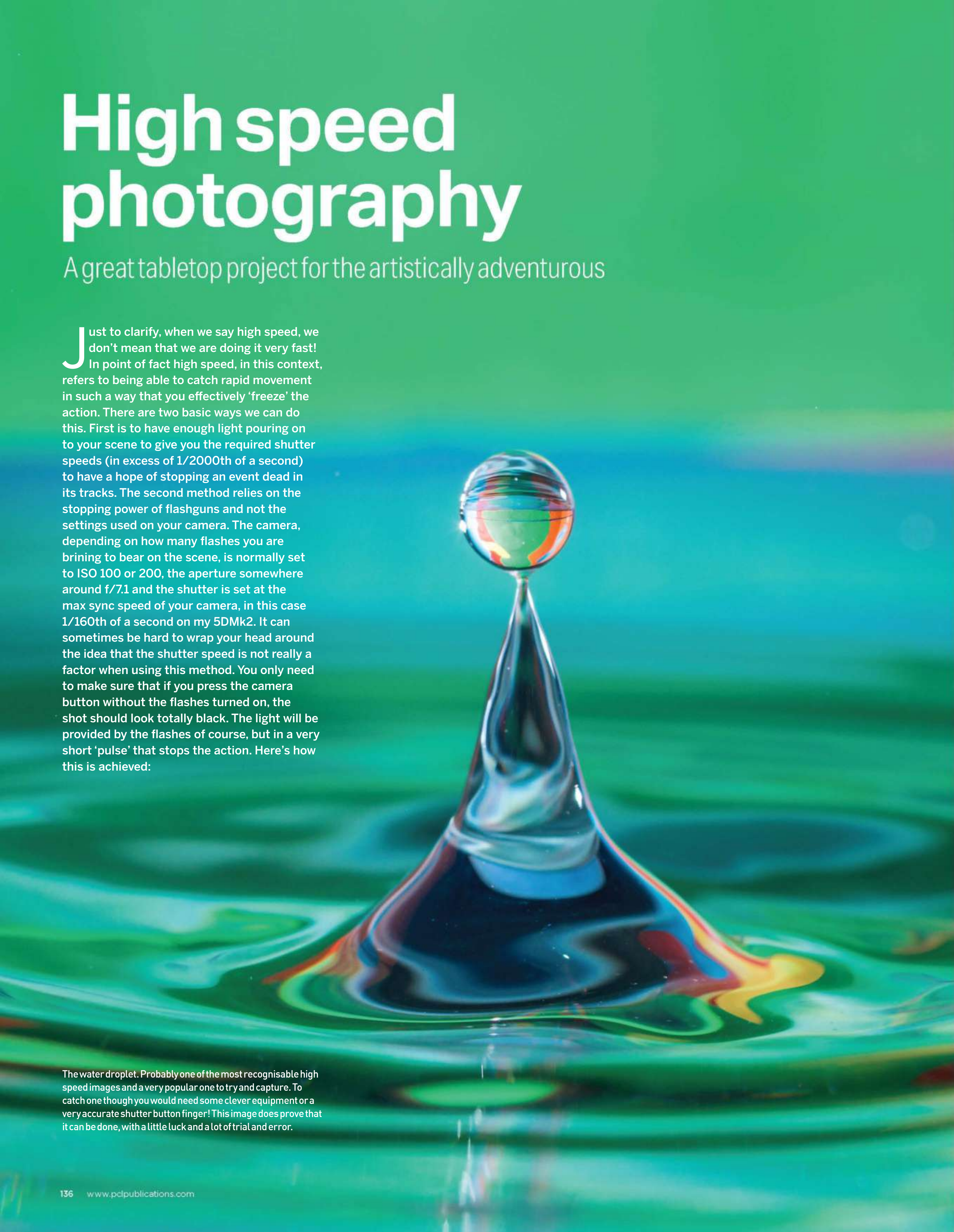
Be patient and carry on!

As they say, "memory is cheap, but memories are priceless". Pets are challenging subjects so you're just going to have to stay sharp and keep shooting. The more you shoot, the greater your chances of hitting that perfect shot! ■

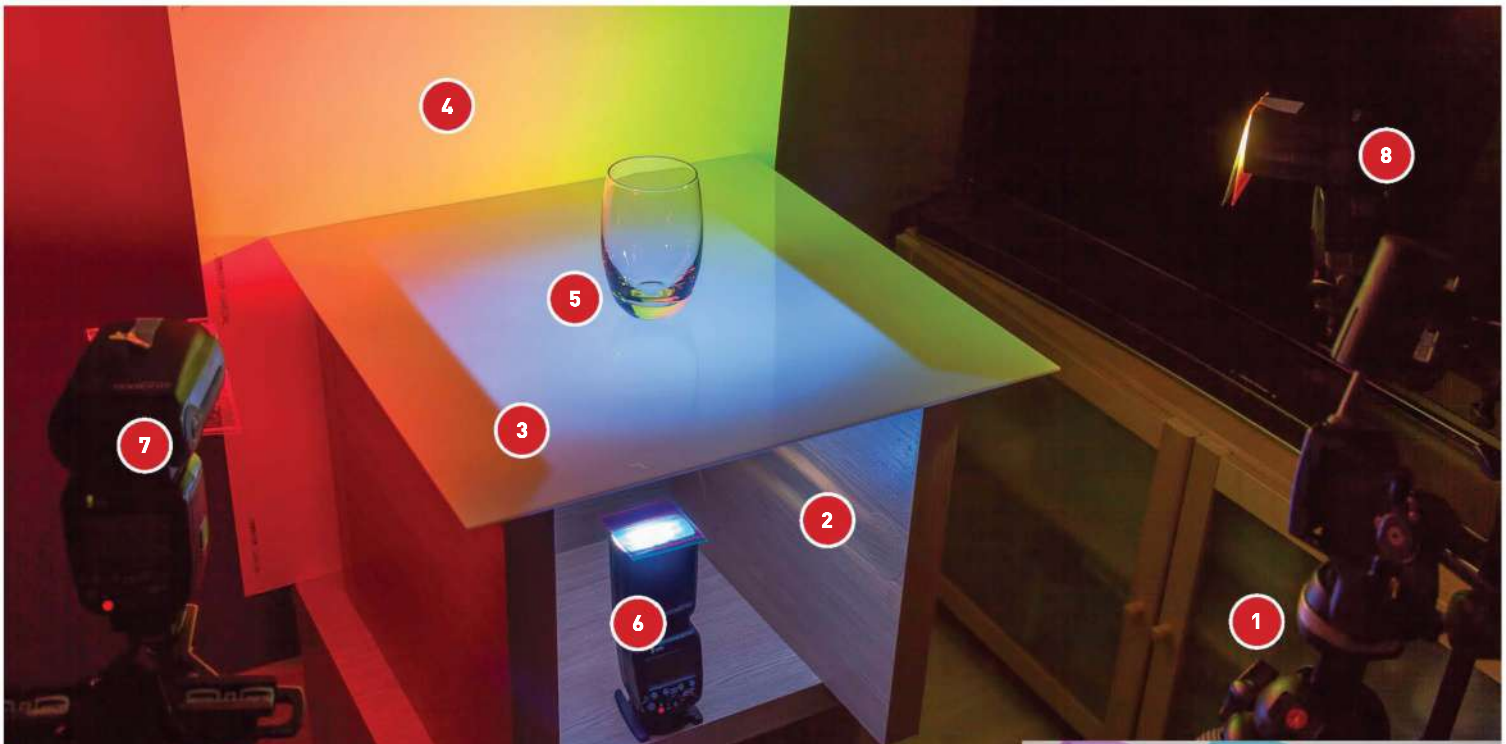
High speed photography

A great tabletop project for the artistically adventurous

Just to clarify, when we say high speed, we don't mean that we are doing it very fast! In point of fact high speed, in this context, refers to being able to catch rapid movement in such a way that you effectively 'freeze' the action. There are two basic ways we can do this. First is to have enough light pouring on to your scene to give you the required shutter speeds (in excess of 1/2000th of a second) to have a hope of stopping an event dead in its tracks. The second method relies on the stopping power of flashguns and not the settings used on your camera. The camera, depending on how many flashes you are brining to bear on the scene, is normally set to ISO 100 or 200, the aperture somewhere around f/7.1 and the shutter is set at the max sync speed of your camera, in this case 1/160th of a second on my 5DMk2. It can sometimes be hard to wrap your head around the idea that the shutter speed is not really a factor when using this method. You only need to make sure that if you press the camera button without the flashes turned on, the shot should look totally black. The light will be provided by the flashes of course, but in a very short 'pulse' that stops the action. Here's how this is achieved:



The water droplet. Probably one of the most recognisable high speed images and a very popular one to try and capture. To catch one though you would need some clever equipment or a very accurate shutter button finger! This image does prove that it can be done, with a little luck and a lot of trial and error.



The technical bit

Flashes (strobes or speedlights as they are also known) have an interesting operating characteristic. Their output brightness is not governed by the unit's power. The effective brightness of the flash is always the same. It is only the duration of the flash that changes, so less power means shorter flash duration. For instance, a Canon 580EX flash at full power has a duration of 1/1,000th of a second. Dial the flash down to 1/8th power and the flash duration becomes 1/9,000th of a second. Set it at 1/64th power as I have done here for my shoot, and you can achieve a flash duration of a mind-boggling 1/30,000th of a second!

Now imagine if this incredibly fast pulse of light was your only light source in a dark room. If you take a shot with your camera with the flash set as described, even though your shutter speed is 1/160th of a second as we mentioned above, your subject will only be lit for 1/30,000th of a second during the time your shutter is open. The trade-off with this method is that your flash is at a very low power setting and has to be very close to your subject. As this is a tabletop project, it's not an issue because you are going to be shooting at very close quarters anyway.

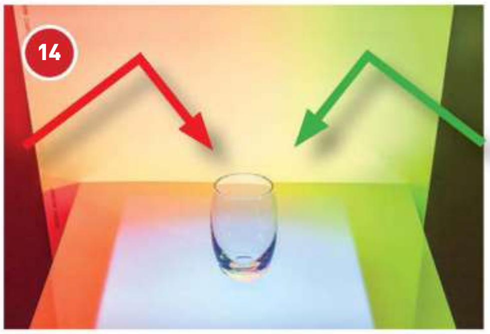
The setup

Our shot is going to be a very simple water droplet splashing down into the surface of a small body of water. It is quite a popular photo to capture, and is easy enough to set up. The camera is set on a tripod **[1]** in front of a makeshift mini-studio. A table **[2]** is turned on its side and a piece of opaque Perspex **[3]** is set on top. A sheet of white card is placed at the rear of our 'set' **[4]** to create the background. Our water receptacle, a simple glass **[5]**, is placed on the Perspex, in the middle, and filled to the brim with water.

This example has three flashes **[6] [7] [8]** that were originally set up, although after a few tests, it was only two that were finally used. Just for the sake of creativity, one was set underneath the Perspex, firing upwards, to create a nice pool of light at the base of the glass. Again, just to be a little creative, the flash underneath the Perspex and the flash to camera left had coloured gels **[9]** put over them. After some trial and error **[10] [11] [12]** it was decided to use blue underneath and red on the left **[13]**.

On reflection

One aspect to consider is that when photographing clear liquids, it can be more effective if you cast your light on a surface that the liquid can reflect **[14]**, rather than firing directly at the liquid itself. The flash on the left was aimed at the white card at the rear of this setup so that when it fires, it illuminates the white card and colours it red. Our water will reflect this colour as well as the blue light coming from below and this combination will hopefully create a nice dramatic effect.



The shoot

The flashes are controlled by a wireless transmitter **[15]**, but you can also use a camera mounted flash, bounced off coloured card on to your scene if needs be. You could also get your flash off-camera by using a hot-shoe cord. After a few test shots to get framing and flash power dialled in, the settings worked out as follows: the camera was set at ISO 50, aperture f/7.1, shutter 1/160th **[16]** and was shooting Raw. The lens is a 24-105mm f/4 zoom lens **[17]**. The flash firing up from below was set at 1/16 power **[18]** and the flash on the left was set at 1/32 power **[19]**.

The area of focus was the point where we were attempting to get the water droplet to land. We could generate a reasonably consistent flow of drips by using a syringe filled with water **[20]** and slowly depressing the plunger and aiming our drops at the centre of the water surface. Trying to capture a single drop hitting the surface without the aid of specialist timing equipment could have you trying all day long with no success. This way at least, you can create a steady series of drops that will increase your chances of capturing the decisive moment of splashdown.

17
CANON ZOOM LENS EF 24-105mm 1:4 L IS USM
24-105mm
IMAGE STABILIZER

Drip, drip, drip

The process was to gently drip water into the glass and shoot at the same time. It can be a bit random, but as mentioned before, without special equipment that can time the camera's firing down to milliseconds, you just have to persevere. The sample shots you see here were all done by one person with syringe in one hand and the other hand pressing the shutter release button. So, many frames later, a fairly decent number with usable droplet captures, it was time to go for the big one! The water drop images are very cool and do make for good abstract images, but it was time to end on a big splash. With the glass full to the brim, an ice cube was dropped in from a decent height to create a big splash. It took a couple of goes, but some great captures were in the bag. Finally, a

16
160
7.1
504

18
600EX-RT
LINK

The shot of a droplet of milk dripping down into a small pool of the same liquid can create the ever popular and quite iconic image of the droplet splash. Even though the milk is white, it is reflecting the light cast by the flash with the blue gel on it.

quick experiment to see if another liquid could be used. The Perspex was cleaned and a pool of milk was dripped into place by the syringe. Then more milk was dripped from above and captured in the same way as the water. Different coloured gels were tried on the flashes and another set of interesting images were captured.

To finish

The preferred shots were processed in a Raw editing package and then edited, rotated and cropped in Photoshop. Some colour values were altered even more to give an interesting surreal look to the pictures. So, with some initial trial and error, the end results could easily end up as a large format canvas print and be adorning the wall of some happy art lover! ■

> *"The water drop images are very cool and do make for good abstract images..."*

Action and sports

How to capture movement and excitement

> *"Many professional sports shooters will specialise in one particular type of event, becoming experts in one or two techniques that work well."*

Photographing sports and action scenes is a challenging but rewarding part of the hobby. At almost any sporting event, from the company five-a-side team on a Saturday fixture, to international events like the Olympics or the World Cup, you'll find photographers on the sidelines capturing the action. Professional sports photographers make a good living from it, and use specialised equipment such as advanced high-speed cameras and ultra-fast telephoto lenses costing thousands of pounds, but even the average hobby photographer with basic equipment can capture good sports and action shots with a bit of patience and effort.

There are no hard-and-fast rules for sports photography, mainly because there are so many different types of sporting event. A technique that might work well for horse racing would be completely inappropriate for beach volleyball, for example. You have to learn to tailor your technique and the way you use your gear to the event you're trying to photograph. Many professional sports photographers will specialise in one particular type of event, becoming experts in one or two techniques that work well and can guarantee them the reliably good results they need.

Although there are as many techniques for sports photography as there are types of sport, there are some general tips that work well in most situations.

Get close to the action

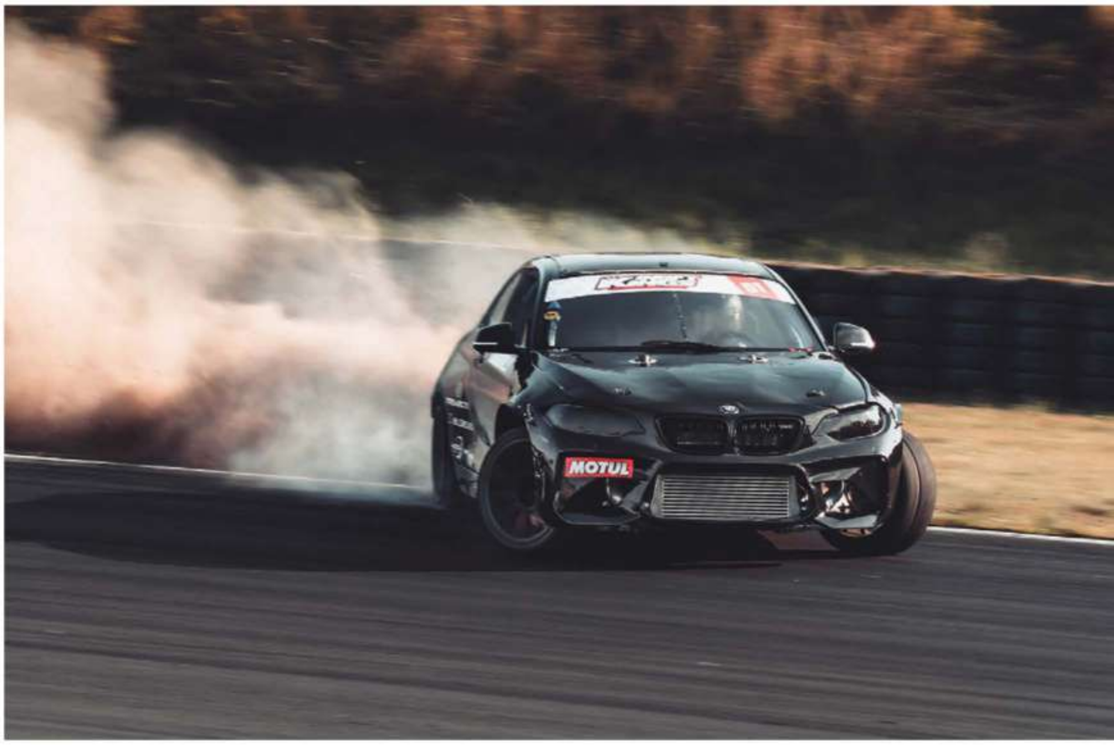
There's a reason why ringside or front-row seats are more expensive. If you want to see the excitement and passion of a close-fought contest, it's a lot harder to do that from 200 yards away over the heads of a crowd. Get as close as you can without putting yourself in danger or interfering with the event you're trying to photograph. For events where you can't get physically close, use a telephoto lens to zoom in.

Capture the moment

Although most people seem to think that a fast continuous shooting speed is the key to action photography, in fact the professionals will tell you

TELEPHOTO LENS

Sportsmen and women don't like to be distracted when competing. Using a long telephoto lens like this Canon EF 600mm f/4L high-speed lens will keep you a safe distance from your subject, who may be at a critical point in their sport.



that good timing and fast reactions are much more important. It also helps enormously if you have an understanding of the sport you're photographing so that you can anticipate when the best moments are going to come along. A camera with a good fast autofocus system and quick shutter response is much better for action photography than one that can shoot at 10 frames a second. Being in the right place is also important. You're going to get more drama at the finish line of a race than halfway down the track.

Control shutter speed

One of the keys to good action photography is appropriate use of shutter speed. Although the traditional approach to sports and action photography is to use the fastest shutter speed available, and the sports mode on your camera will try to do this automatically, it's not always the best approach. Using a very fast shutter speed freezes the action, which can rob the picture of any sense of movement. To capture fast-moving subjects, try using a slightly slower shutter speed and panning to follow the action. If you do it right you'll have your subject nice and sharp against a movement-blurred background. If you are using a normal telephoto or zoom lens, i.e. not one that cost £3,000+, then the restricted aperture at longer focal lengths will limit your choice of shutter speeds; don't forget you can get faster speeds at higher ISO settings, although beware of image noise above about 1600 ISO.

Compose your shot

Just because you're documenting a sporting event, it doesn't mean your shots can't be well-composed. Try to find a viewpoint that provides an interesting angle, or at least an appealing backdrop to your shot. If you can compose your shot so that it both looks good and provides an accurate impression of the event, so much the better.

One of the most useful compositional tips for action photography is the concept of implied movement; always try to have your subject moving into the frame rather than out of it. ■

Night photography

Some tips for quality night shots

Whether it's the lure of bright city lights, barren moorland bathed in moonlight or a tumbledown barn in the country under a starry sky, night-time photography is a big draw for many photographers. It can be challenging, it can be very frustrating and time-consuming, but once you get the bug for it and get those first few 'wow!' images under your belt, it's a hard habit to break. There are a lot of photographers who find the whole process very relaxing.

As you are normally dealing with much longer exposures than usual and having to carefully compose and focus your shots, it forces you to slow it all down and take a much more considered approach. After all, if you set up a ten-minute exposure and the end result is disappointing, you could angrily pack up your gear, set off home, and miss out on a very rewarding aspect of photography. To make sure you get the most out of your photos, here are a few tips that should see you well on your way to capturing amazing night shots.

> *"It can be challenging, it can be very frustrating and time-consuming, but once you get the bug for it and get those first few 'wow!' images under your belt, it's a hard habit to break."*

Use a tripod

This may sound a bit obvious, but if you want to take photographs where exposure times can sometimes be in the tens of minutes, you're going to need something sturdy to put your camera on. You can of course set your camera to its highest ISO setting, open the aperture as wide as it will go and shoot handheld, but to really do the image justice you're going to need a solid tripod. One thing is worth mentioning; pay particular attention to the surface on which you're setting your tripod. shooting at the water's edge on a beach is a good example. The tripod may be pushed firmly into the sand and your long exposure is under way. One larger-than-usual wave and the feet of your tripod are swamped. Not a big deal, but the water can soak into the sand, which becomes soft, and the tripod can start to list over to one side ruining the shot. An attempt higher up the shoreline away from the waves might be in order.

Keep the ISO low

Because you have your tripod keeping things steady for the camera, you can use the lowest ISO setting your camera will allow. This is a big advantage from the point of view of image quality. High ISO settings create a lot of image noise, and can affect the sharpness of the shot, detracting from the overall quality of the image. Many modern cameras can produce fairly clean shots at high ISO, and it may well be that you can work in the 800-1000 ISO range if the situation demands it, but generally the lower the ISO setting, the better the result will be.

A lot of cameras also offer Long Exposure Noise Reduction (LENR). This works by taking a second exposure of just the sensor noise which is then used to subtract the noise from your original shot. What this means is that if you take a five-minute exposure, it will then take another five-minute LENR exposure. For any exposure longer than a couple of minutes, the sensor may start to heat up and this introduces noise artefacts. This is what LENR is trying to remove. It's just a personal preference but many don't use LENR. Like a lot of recent DSLRs most cameras use a CMOS sensor which isn't as prone to overheating, and you could take ten-minute exposures without any noise issues. If you want to try very long night-time images like star trails, consider taking multiple exposures of 30 seconds each and stacking them in Photoshop. For example, 30 exposures of 30 seconds each is equivalent to one 15 minute exposure.

Shoot raw

Shooting in raw mode is a method that allows you to extract the absolute last pixel of quality from your image and process it any number of creative ways non-destructively. You can happily alter white balance settings, cross-process, split raw and any number of effects without losing your original image. Like using low ISO, it's another way of keeping the image quality as high as possible.

Lenses: zoom or prime?

When you're shooting at night there are any number of light sources, such as street lights, headlights, the moon, bright windows, neon signs, all of which are capable of introducing unwanted lens-flare that can ruin an otherwise excellent shot. Lens flare is caused by unwanted light scattered by the optical elements inside your lens. Zoom lenses particularly suffer from flare as they contain many more optical elements. Your best chance of reducing lens flare is to use a prime lens. A prime is a lens that only has one set focal distance and therefore uses fewer internal optical elements. Whether you use a zoom or a prime, a lens hood is recommended for both. Also, wherever possible, use a lens with as wide a maximum aperture as possible, such as f/2.8. You may well be shooting at smaller apertures than this but the image in the viewfinder will be brighter with a faster lens, helping you to see and set up your composition.

Bulb mode

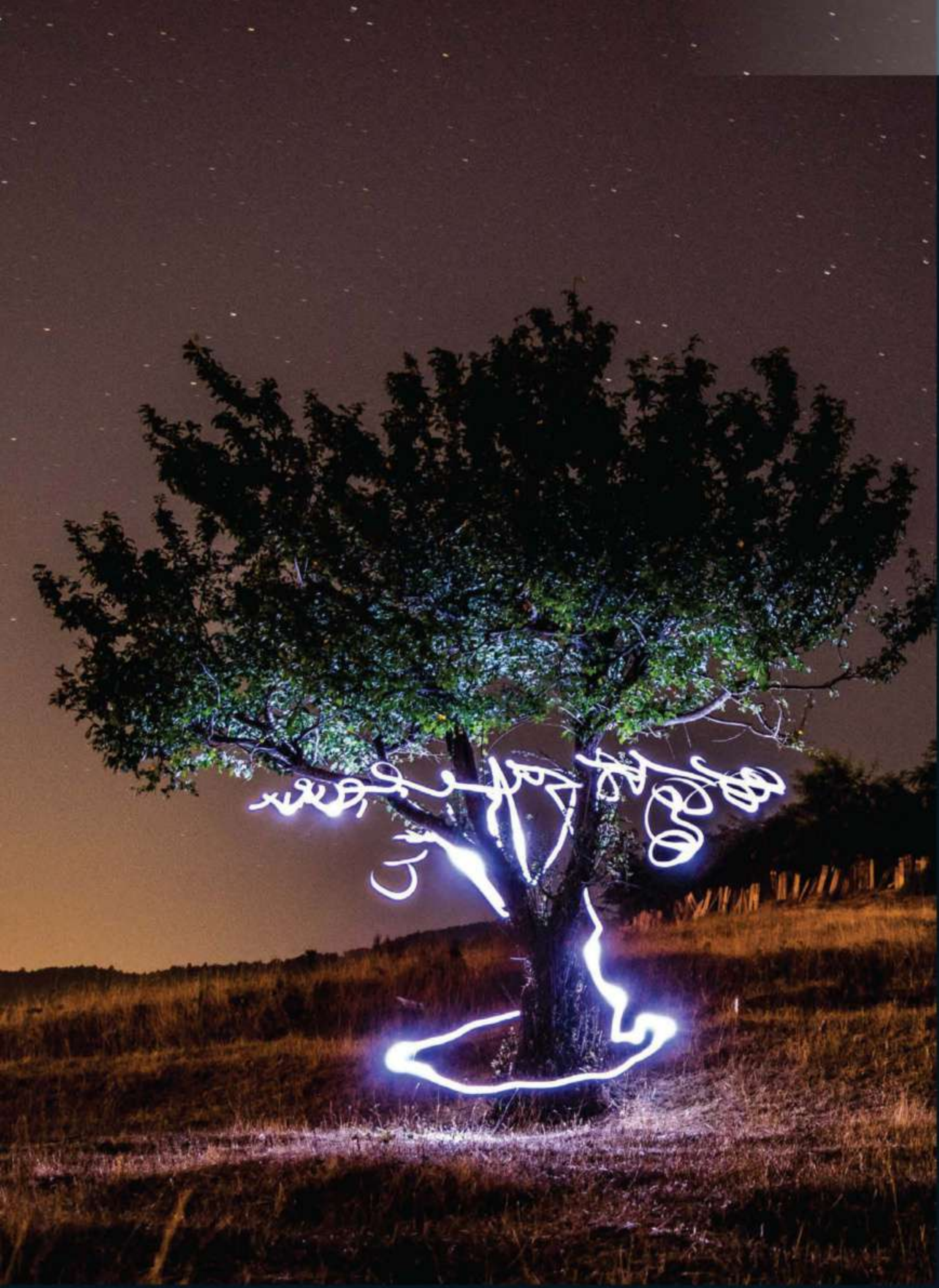
With most current DSLRs the longest shutter speed you can use in normal operation is 30 seconds. However if you switch to Bulb mode ("B") on your camera, you can keep the shutter open for much longer periods. "Bulb" in this case is a reference to the old squeeze-bulb, pneumatically activated shutter release systems from the earliest days of photography. What you don't want to be doing though is standing there

with your finger on the shutter release button for five minutes. Your finger is going to ache and you are going to move the camera and spoil the shot. Attaching a cable release instead is the answer.

This means you can activate the shutter and lock it open for as long as you need. These vary from the simplest 'press to activate' types to fully programmable interval timers that can take multiple shots with durations and intervals between shots set by the user.

Take test shots at high ISO

Since most modern cameras offer very high ISO settings, it makes sense, before committing to a long exposure or a sequence of long exposures, to ramp up the ISO to the max, take a shot and have a look at the composition, framing and



exposure. However if you've just done your test shot at 2000 ISO and it looks great, how does that translate to shooting the same scene but at a lower ISO setting to get the quality?

There is some maths involved but it's not complicated, especially if you have your mobile phone with you.

The mathematical bit

At 2000 ISO your camera meter tells you that for the aperture you have set, a shutter speed of five seconds gives you a good exposure. Now you need to know how that exposure will change when you dial your ISO down to 100. Divide your high ISO number by the target low ISO number (2000/100 = 20), take your answer (20) and multiply it by the high ISO exposure value five seconds - this gets you a final answer of 100 seconds (1.6 minutes). Still with us? If you prefer, there are apps for iOS and Android that can do the heavy lifting for you. A popular one called Expositor, has a nice user-interface that can quickly calculate any combination of EV, ISO, F-stop and exposure time you care to dial in. It's great for quickly and accurately working out the arithmetic without the need to do the sums in your head.

Earth, sky and water

Use this to your advantage. It may have been done to death, but a coastline shot taken with a long exposure reduces the sea to that wonderful misty blanket. If there are patches of clouds in the shot, they appear to streak across the sky when your exposures get up beyond 30 seconds or more. Of course, who can forget traffic trails? They are the staple of long exposure photography. The key word here is experimentation.

Light painting

Seen in the photograph at the top of this page, this refers to the technique of illuminating parts of your scene with additional light sources other than those in the shot. Light painting has become very popular and ranges from simply using a flashlight to illuminate a dark foreground subject, to using all manner of light sources, such as strobes, sparklers, coloured LED lights and even steel wool set alight to create huge showers of sparks, all of which create bizarre and abstract "light art". It's worth looking into if you're thinking of taking night photography to a whole new place.

It's dark out there. Go take some photographs. What are you waiting for? ■

LONG EXPOSURE GEAR

A good quality, stable tripod, is essential for long exposure photography.

The cable release makes the process of shooting long exposures much easier.

CANON LENS EF 14mm 1:2.8 L II USM

A good quality lens, whether prime or zoom, is expensive, but it is expensive for a reason.

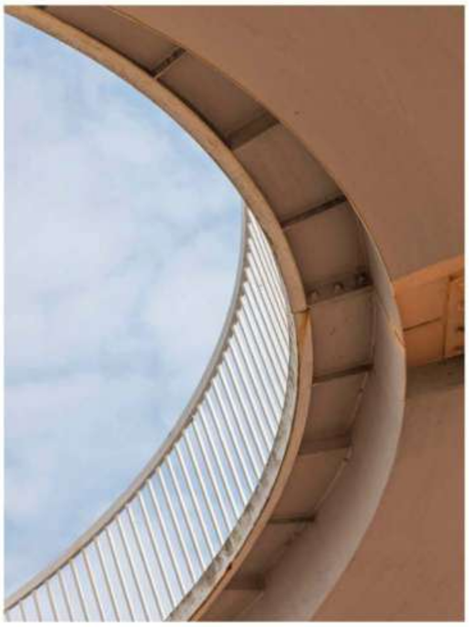
Abstract photography

Challenge your perceptions of what a photograph should be

By its very nature, defining what an abstract really is can be a source of much philosophical discussion. In the broadest sense, an abstract is something that is symbolic and does not represent reality. In photographic terms, then, an abstract image is something that does not reflect reality. This does create something of a problem because everything around us is real (hopefully), so any image contains some element of reality; therefore it can't be abstract by definition. Let's cut through all the nonsense and be a bit more logical about it.

Perhaps an easier way to think about abstract images is to consider them as small slices of reality that, when viewed in isolation, give no clue as to what they are in real life. A very extreme example of this could be an electron-microscope image of human skin at enormous magnification. Without some frame of reference, you would have no idea what you were looking at, so you could consider it an abstract image. OK, as mentioned, that is a very extreme example. The truth is, though, opportunities to explore abstraction are all around us. You just need to know where to look.

In many cases, colour can also be a key identifier as to what the image is. Grass is green and sky is blue are obvious colour references that we understand. Remove colour from an abstract image and you take away another visual clue by which you could possibly identify it. You are left only with shape, tone, form, pattern and texture. This is a positive boon to the abstract photographer because that is exactly what you are after. Another positive aspect of the abstract is that there really are no rules apart from getting your camera settings dialled in correctly.



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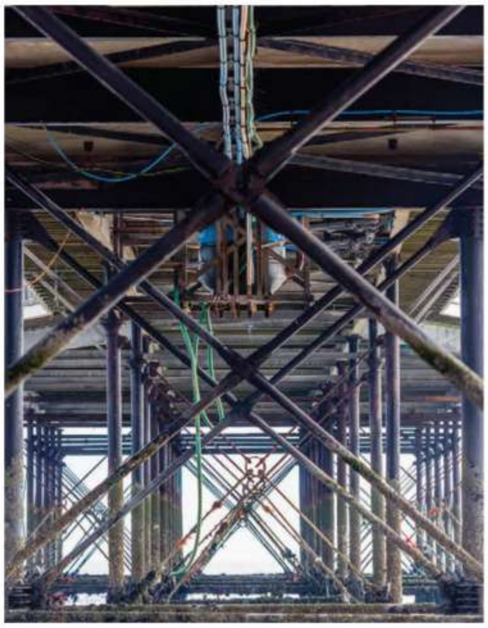
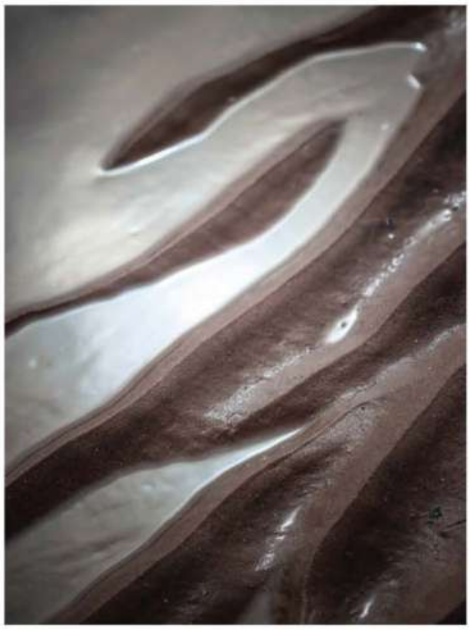


Subject matter is no problem at all. There are so many abstract subjects you can cover in the world of architecture, both rural and urban. The world of the organic, flora and fauna, have huge possibilities, as does the realm of the inorganic. There is shape, form, pattern and texture wherever you look, enough to boggle the mind. There are abstract opportunities in the shapes and repeating patterns of the man-made environment, as well as the more fractal patterns in nature. A good macro lens is a superb method by which you can isolate patterns at a small scale; and with the additional use of very shallow depth of field, you have even more scope to create arresting and thought-provoking imagery.

There is also much abstract imagery to be had at a larger scale as well. If you happen to live in a large modern city, there are no doubt a great many glass-fronted buildings where the surfaces create many reflections and patterns within their structures. The bottom line is that if you can shoot an image that contains interesting shapes, patterns and tones, but you cannot easily recognise what the object might be, then you have your abstract. ■



High Dynamic Range photography

HDR photography is very popular but use it with care

High Dynamic Range, or HDR, imaging is a technique that has become very popular over the past few years, particularly for landscape photography. It's actually quite easy to do, and some of the latest cameras will actually do it automatically. You simply shoot three or more copies of the same image at different exposure settings, so that over a series of photos you capture highlight, shadow and mid-tone details. You then combine these shots into one image that compresses the full range of tones so that there are no burned-out highlights or dark shadows.

The most recent versions of Adobe Photoshop have an automated function that can do this for you. There are also a number of third-party applications that function in the same way, but it doesn't work with everything and many people do over-use it. It works best with pictures that would otherwise have areas that would be too light or too dark, such as these landscapes taken on Dartmoor and the Devon coastline. ■

See what the eye sees

The human eye can perceive around 24 stops of light from darkest black to brightest white. Most digital cameras can only capture approximately 12-14 stops. Currently, cameras like the Canon 5D Mark IV and R8 have some of the best dynamic range around. Even this is not enough to fully capture all the light available in the scene like the human eye does. The trade-off will be that you have to take a shot that retains the brightest areas of the shot at the expense of losing details to solid shadow; or you retain detail in the darkest areas and face the prospect of the brightest areas blowing out to pure white and losing detail that way.

An example

A lovely sunrise or sunset image with a silhouetted foreground object is a typical example of how much light goes unseen by a camera. Although the sky may look beautiful and well exposed, the foreground object is in silhouette, purely because the contrast between them is far too great for the camera to accurately record. Set your exposure to reveal detail in the foreground object and the result will be a sky that blows out to pure white with complete loss of detail that no amount of processing would be able to recover.

Bracketing exposures

To capture the scene in all its glory, you will need to take several shots of the same scene but with different exposures. This is referred to as Auto Exposure Bracketing (AEB). You'll need one exposure sufficiently underexposed to capture the brightest parts of the scene, such as the sky, correctly. Next is an average exposure of the scene and finally, an overexposed shot that records the darkest areas of the shot in sufficient detail. The set up to do this is fairly simple. There are just a couple of things to be aware of before you start shooting.

Things to bear in mind

You will be shooting multiple exposures of the same scene and will need to set your camera up on a tripod, so that it is held securely with no chance of camera movement. If you try to shoot hand held, even the slightest movement between each shot could ruin your final HDR image because of image mismatches.

Remember also that certain scenes are not suitable for HDR. Any shot that contains a lot of movement, such as trees swaying in the wind, will result in final images having many ghosted areas, as things have moved between each of the exposures. Nice static scenes work best, although things such as flowing water can sometimes work quite well if you have long enough exposure times to render it soft and fog-like.

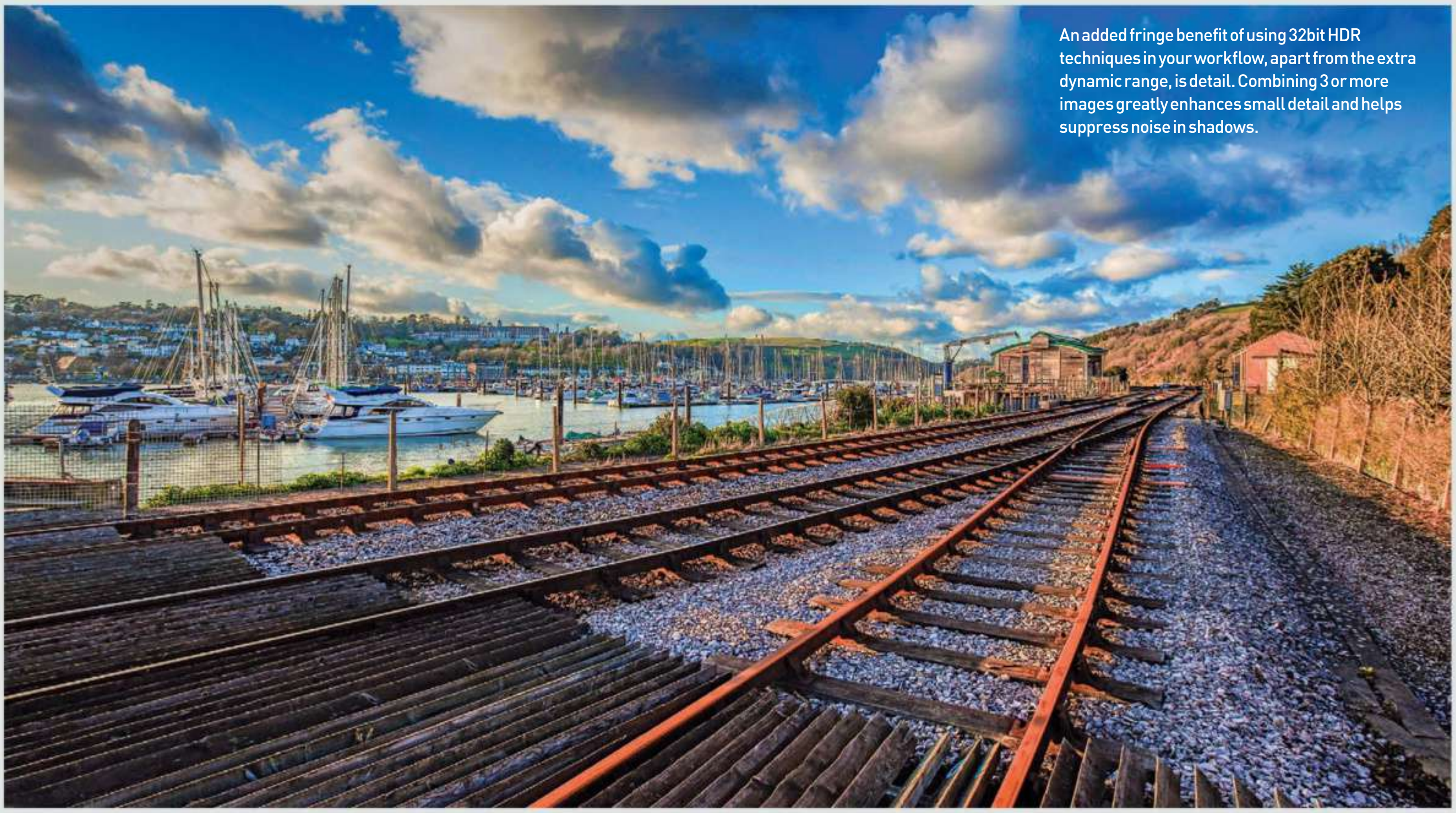
It is also generally held that HDR images work to their best effect, if you shoot using an aperture as small as possible for maximum depth of field and acceptable sharpness throughout the scene. Shots with very shallow depth of field can sometimes come out with banding and image artefacts once processed into a final HDR.

The choice of lens to use is very subjective but generally speaking the main subjects for HDR images are landscapes or cityscapes that require a large field of view to take in the scale of the scene. Any lenses that fall within the 16mm - 35mm zoom range for full frame sensors or 10mm - 20mm for APS-C sensors will do the trick but it is entirely up to you.

Getting set up for HDR

Make sure your camera is set up to shoot Raw. We say it time and again but it rings true with techniques like this where you want to squeeze every last pixel of usable data from your images. The technique will still work with JPEG files but if you can, use Raw. Shooting Raw also means you don't have to worry about making sure you set things like White Balance to manual rather than auto in order to keep the white balance consistent across the exposures you take.

“With the right subject the results can be astonishingly beautiful, but it doesn’t work with everything and many people do over-use it.”


An added fringe benefit of using 32bit HDR techniques in your workflow, apart from the extra dynamic range, is detail. Combining 3 or more images greatly enhances small detail and helps suppress noise in shadows.

Make sure your ISO sensitivity is set as low as possible so that there is as little image noise as possible. Remember that higher ISO values result in more image noise. Most cameras will let you set ISO 100. Some let you go down to ISO 50, although there has been debate as to whether this results in a small loss of dynamic range at this lower ISO setting. Set your metering mode to Evaluative (Canon). This measures brightness and contrast in the scene and determines what the exposure should be to give a good overall average. Then make sure your camera is in Aperture Priority mode. This means you can select which f/stop you use and the camera will work out the other settings. F/11 is a good starting point. Locking down the aperture for each exposure is important to keep the sharpness consistent in each capture.

Next, you will need to select Manual Focus. As a very rough guide, you can focus one third of the way into the scene to get as much front to back sharpness as possible. Manual Focus also means you are able to determine the point of focus rather than the camera deciding for itself. You can use your camera's live view function if it has one, to determine whether the area you want is in sharp focus. If you have a particular object that you want to be the absolute point of focus, then use your camera live view to get that in sharp focus.

Almost there

Then comes the key to getting the exposure range required. You will need to turn on your camera's Auto Exposure Bracketing function. You may need to dip into your camera's manual if you haven't used it before and locate the AE Bracketing function. Here you can specify the sequence of shots your camera takes and just how much underexposure and overexposure will be applied to the shots. Depending on your camera model, you can shoot a 3 shot sequence. Other models allow you to shoot 5, 7 or more shots as part of your capture sequence. You can also specify how many stops of exposure separate each shot. For instance, a 3 shot sequence 2 stops apart will result in a bracketed sequence that runs: -2 (2 stops underexposure), 0 (averaged exposure), +2 (2 stops overexposure). A 7 shot sequence 1 stop apart would run: —3, 2, -1, 0, +1, +2, +3. Generally, the more you can capture the better.

Capture the sequence

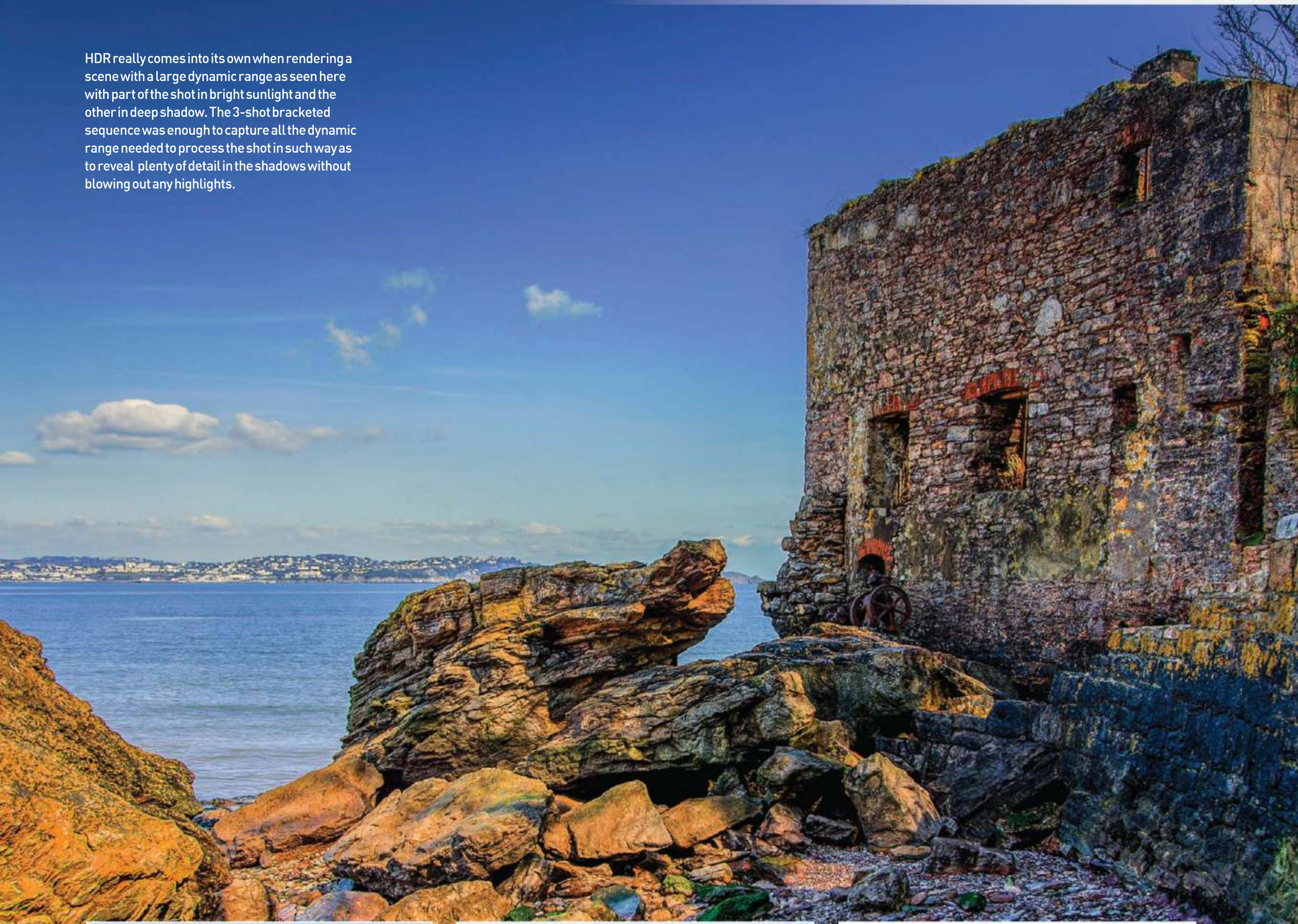
When you're ready to take the shot, you have to press the button three, five or more times to get your sequence. This can introduce unwanted movement into the equation. Most cameras can be controlled with a cable release. Better still, have a built in timer or continuous shot function that allows you to just press the shutter release button to make the camera count down for a few seconds, and then fire off the sequence with no intervention required by you. Again, for individual camera models, you may need to find this self-timer function in your manual.

Make or break time

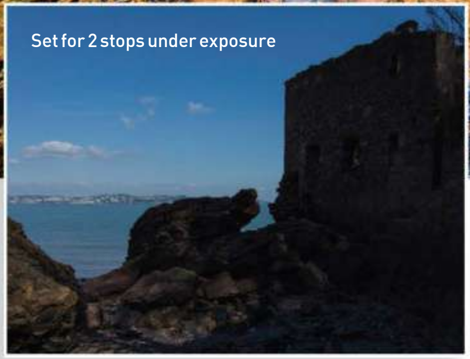
So you have captured your sequence. What next? You have a number of options. You will need to process your sequence of images in your favourite program. If you have Photoshop, you will also have Adobe Camera Raw (ACR). ACR is not as advanced as Lightroom but it still has a great feature set that is perfect for getting the most out of your images. You can save them as high quality 8 bit JPEG files or 16 bit TIFF files and use a third party program like Photomatix Pro or HDR Efex Pro 2 from the Nik collection. You can also use Photoshop's own Merge to HDR Pro function.

Whether using Photoshop's own HDR toning methods or the third party apps, this is where you make or break your image. HDR has something of a bad reputation because a lot of the HDR examples you see online are awful in the extreme. Many images are so badly over-processed that they look like a bad psychedelic nightmare with over-saturated colours and a very heavy-handed approach to micro contrast. The key to a good HDR image, is that it should look natural with a good range of tones. HDR images should be beautiful, not capable of giving you a migraine.

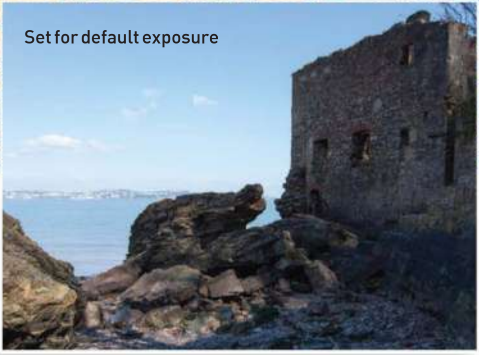
Now you can enjoy capturing and processing your HDR images and start producing photos capable of restoring the good name of this amazing technique. ■



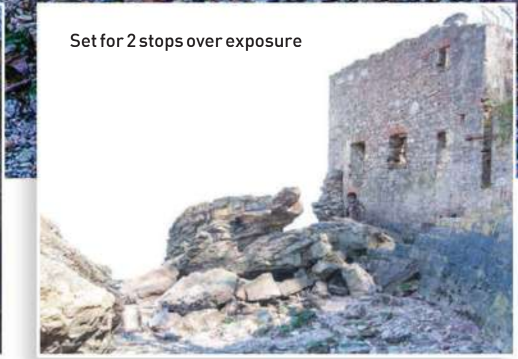
HDR really comes into its own when rendering a scene with a large dynamic range as seen here with part of the shot in bright sunlight and the other in deep shadow. The 3-shot bracketed sequence was enough to capture all the dynamic range needed to process the shot in such way as to reveal plenty of detail in the shadows without blowing out any highlights.



Set for 2 stops under exposure



Set for default exposure



Set for 2 stops over exposure

The 3 photographs shown above were part of the 3-shot bracketed exposure that was used to create the coastal landscape image seen on the far left. The first shot was taken at the camera's default meter reading and then, using exposure compensation, the camera was set to take the next shot and underexpose it by 2 stops. The final shot was set to overexpose by 2 stops. We now have 3 shots that can cover the dynamic range of the scene far better than could be achieved with just one shot.

As mentioned, Photoshop has an HDR function whereby you can merge the 3 shots and extract the best tonal range possible. That said, Photoshop's presets can be a bit lacklustre, or even heavy-handed. There is an option you can try referred to as '32bit Floating Point HDR'. Put simply, you open the 3 images in HDR applications, like Photomatix Pro, and instead of applying any local contrast adaption presets, you click the colour mode to set the image to 32bit. Now you can save the raw image data as a 32bit TIFF. Be aware though, the file sizes for these types of images can be pretty vast because this format contains the complete tonal detail and colour data for all 3 images.

The trick now is to open this TIFF in any of the recent Raw processing applications that can handle 32bit images. Adobe Camera Raw and Lightroom CC for instance. You can now use your Raw software and process it as you would a standard Raw image but the amount you can tweak your image is much greater due to all the information contained within this 32bit TIFF. To our mind, the results obtained using this process look much more appealing. It's true you do have to modify your approach a little and contend with large file sizes but we think in this case the ends justify the means.

Filter masterclass

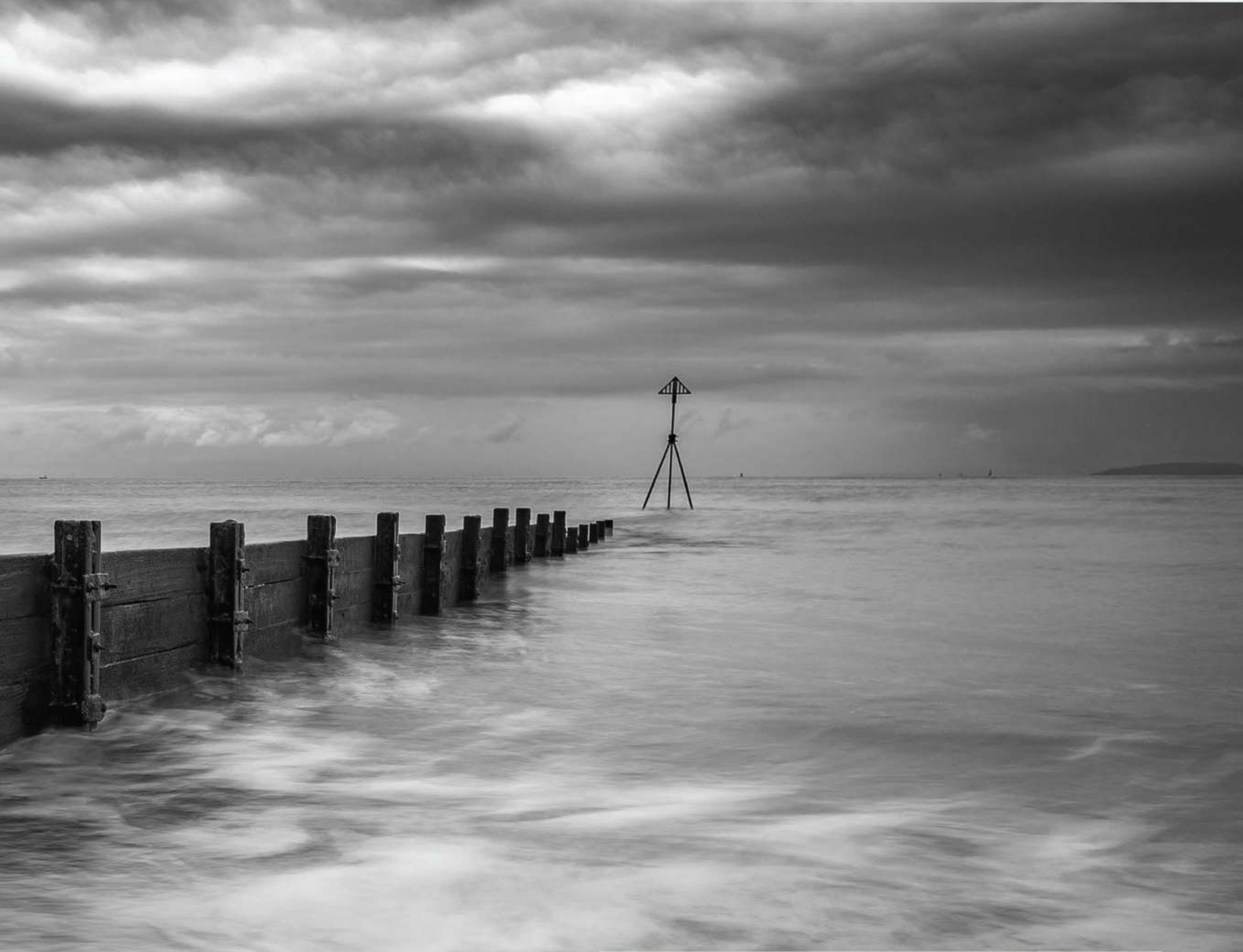
Learn how to enhance your photography with the use of filters

As your photography skills increase and you delve deeper into the techniques available, you are very likely to encounter words like Neutral Density Filter, Graduated Filter and Polarising Filter. Filters, in this case, are not the kind of effects you add in Instagram at the touch of a button, these are physical items that are attached to your lens to alter the incoming light that is hitting your camera's sensor. Don't think of these filters as somehow being old-fashioned and just opt to do it all in post, filters are still a very relevant aspect of your photography skills and techniques and that's why we wanted to introduce a few of them to you and give you an idea of what they can do.

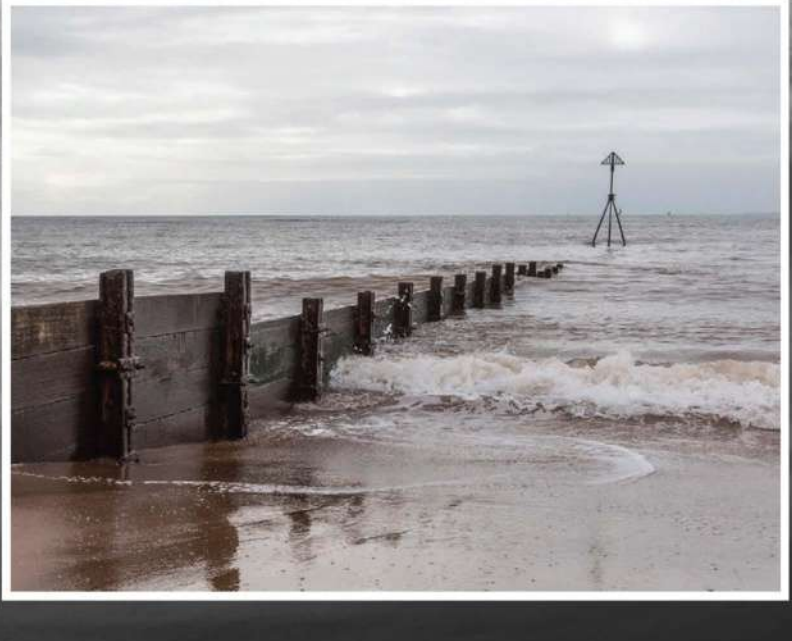
The idea of shooting a well-balanced exposure and getting it as perfect as possible in-camera is a skill worth pursuing. There are a number of filters that produce effects which are difficult, if not impossible in some cases, to reproduce in Photoshop. We would always encourage any photographer to consider trying to achieve more in-camera at the time of shooting, while discovering what a pleasure it can be to get more hands-on with the photographic process when you are actually out in the field.

Filters essentially come in two flavours: round and square. The round ones are threaded and screw directly onto the front of your lens, if you have a lens with an 82mm diameter you will need to purchase a round filter with the same dimensions. This can be a bit tricky if you want to use other lenses with different size screw threads, as it would mean buying more than one size of the same filter, which could get very expensive very quickly.

The alternative is to purchase a square filter system, this comes with a filter holder which screws onto your lens and if you have several different size lenses you can get adaptor rings for attaching



> *"The idea of shooting a well-balanced exposure and getting it as perfect as possible in-camera is a skill worth pursuing."*



Although modern optical coatings for digital lenses have surpassed Skylight and UV filters, they can still be your front-line defence against dirt and moisture.

HOYA 72mm SKYLIGHT (1B) JAPAN
CANON LENS EF 85mm

COKIN - Ø 77 X 0.75 - FRANCE
X-PRO

A Cokin filter holder for square filters can be attached to any lens with an adaptor ring.

72mm SKYLIGHT (1B) JAPAN

the holder to any lens you want to use. The square filters, which the holder uses, are all the same size so you only need to buy one filter of any given type. There are plenty of manufacturers out there making both round and square filter systems. Lee, Cokin, Hoya, Kenko, Benro and Kase are some of the more well-known and popular systems, but there are any number of cheaper alternatives. Be aware though, if a filter or filter system from an unheard of company appears to be very inexpensive, it probably means that the filters are made from sub-standard materials, often they are made from cheap plastic and a filter that is meant to be colour neutral is in fact, anything but.

We love using filters when out on a landscape shoot, they can transform your images and it's very freeing not to be shooting with Photoshop firmly in mind for the end of the image-capture process. Why not get out there, go old school and get some filters in your life? Here's a list of some we think you should have in your kit bag.

The UV and skylight filter

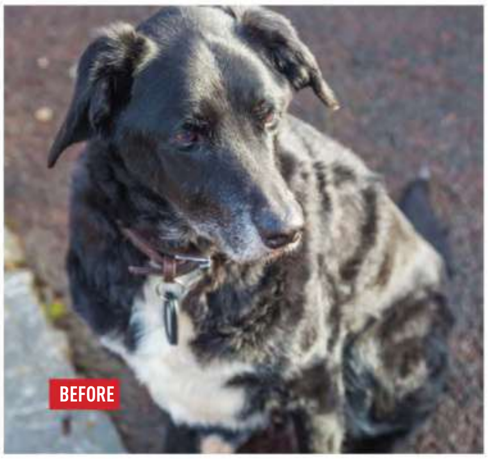
The skylight filter has a very subtle pink tint to it, which was originally created to reduce the blue cast found in colour film stock and both the UV and skylight filters are also designed to filter out a certain amount of ultraviolet light in an attempt to reduce haze. These days, with the advent of digital cameras, the need to correct the blue cast no longer exists and many modern lenses have special coatings that can do the same job as these filters, so why have them at all?

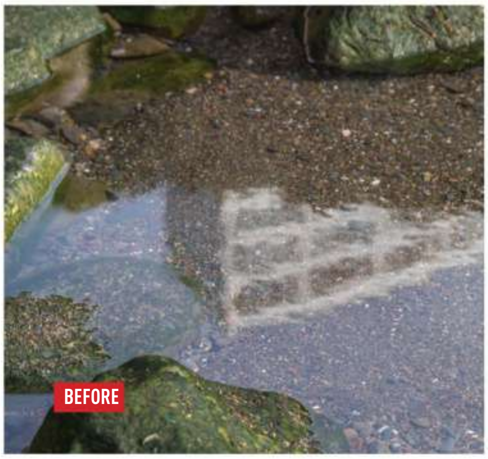
The truth is, they are now mainly used to protect the front element of your lens from the ever-present danger of contamination due to dust and dirt, as well as to safeguard against scratches, better to scratch a cheap UV filter than ruin a lens worth hundreds or even thousands. Since their main function is the protection of your lens, round screw-on UV and skylight filters are the best option here.

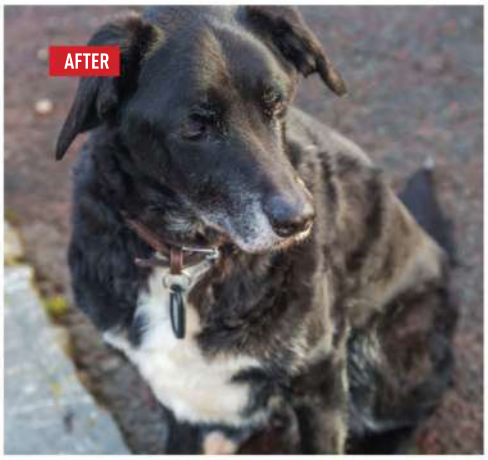
The polarising filter

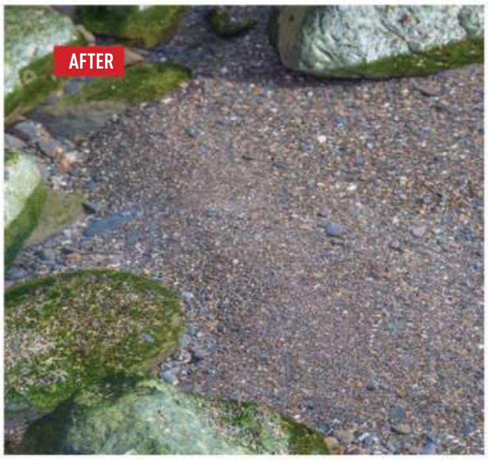
A circular polarising filter (CPL) is used to increase saturation and to reduce or eliminate certain reflections or glare in non-metallic surfaces. Round CPL filters come in a rotating mount and screw onto the front of your lens; you simply set up your camera settings as desired and frame the shot then, as you rotate the CPL in its mount, you will notice that certain reflections from objects like water or glass will appear and disappear as you continue to rotate the filter, you'll also notice an increase in saturation. The CPL is also used to darken blue skies on sunny days and if there are white clouds in the sky, the contrast between blue sky and white cloud will increase as the blue darkens, by a substantial amount. It's important to know that for a CPL to work at its best, you really need to have the sun coming in at right angles, either from your right or left side.

In the majority of cases, CPL filters are round screw-on types, however there are also some square filter versions available, such as the Cokin X Pro system and Lee 100mm system, it is still a circular filter but it sits in the filter folder frame and can be rotated like its screw-on cousin. One thing to be aware of is that they do not come cheap in fact a Lee CPL, for their 100mm square filter holder system, is around £200 ($245).

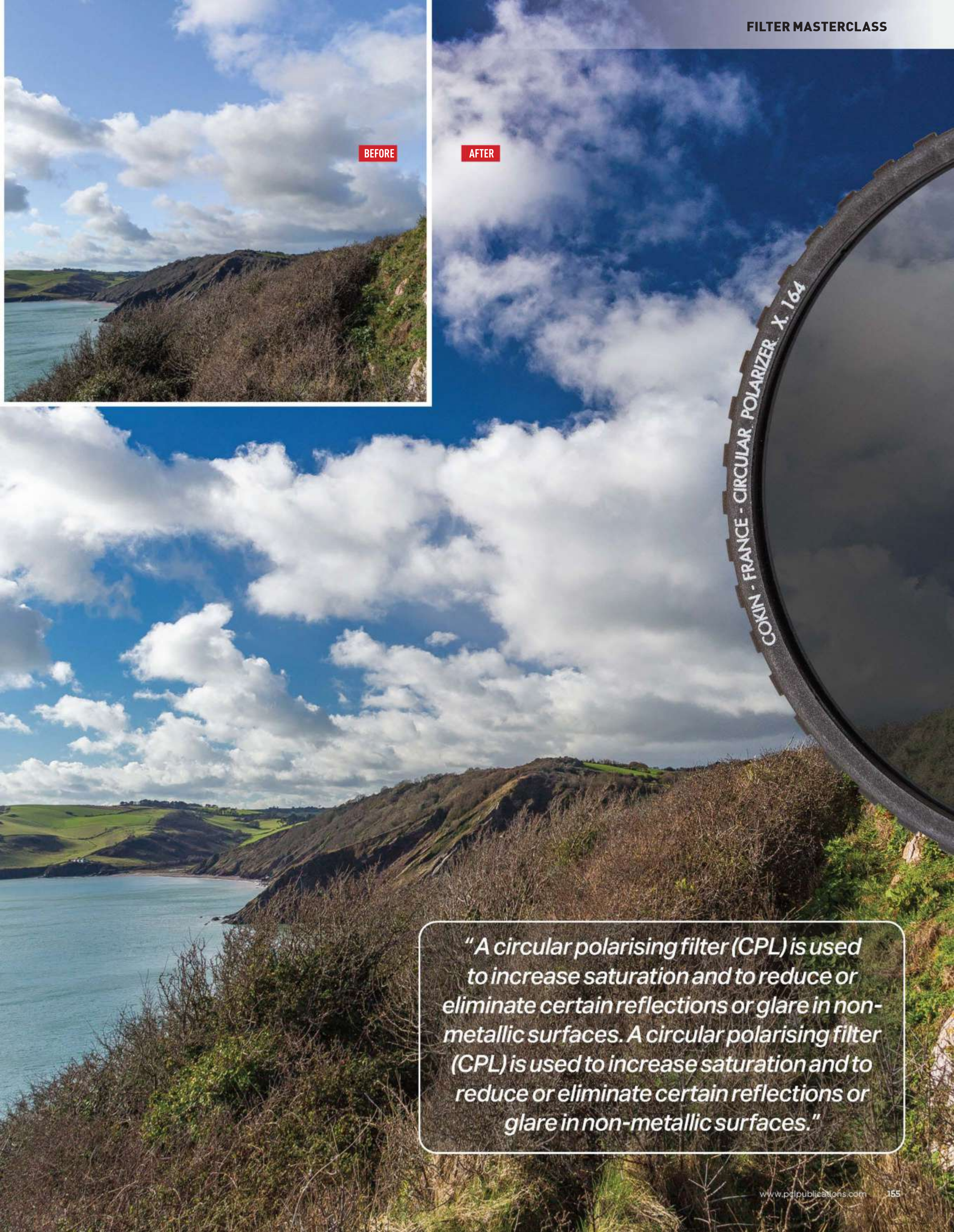








Some of the typical uses for the polarising filter are shown here [left and opposite]. From darkening blue skies, to the reduction or elimination of glare and reflections in non-metallic surfaces.

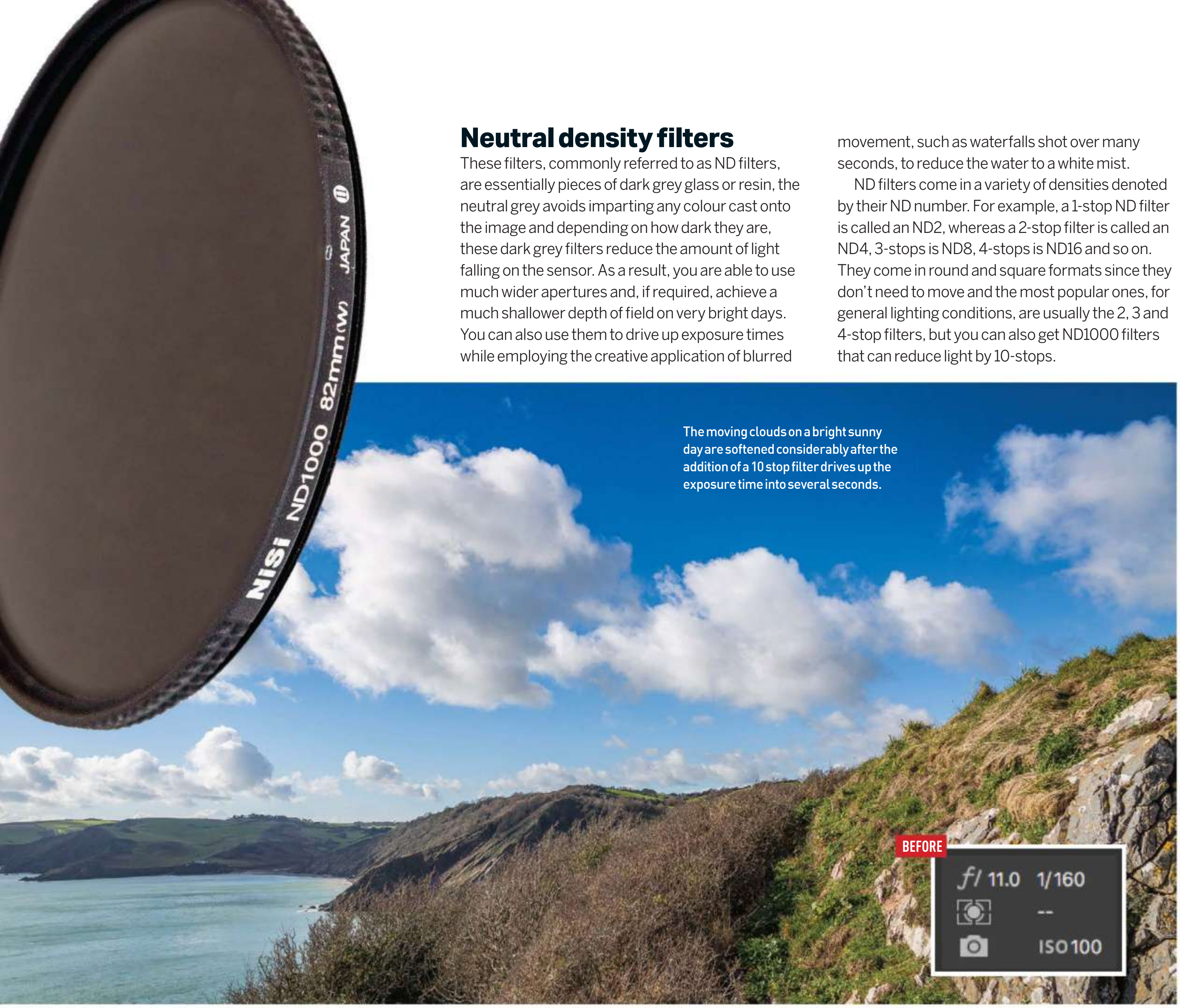

BEFORE
AFTER
COKIN - FRANCE - CIRCULAR POLARIZER X. 164

> "A circular polarising filter (CPL) is used to increase saturation and to reduce or eliminate certain reflections or glare in non-metallic surfaces. A circular polarising filter (CPL) is used to increase saturation and to reduce or eliminate certain reflections or glare in non-metallic surfaces."

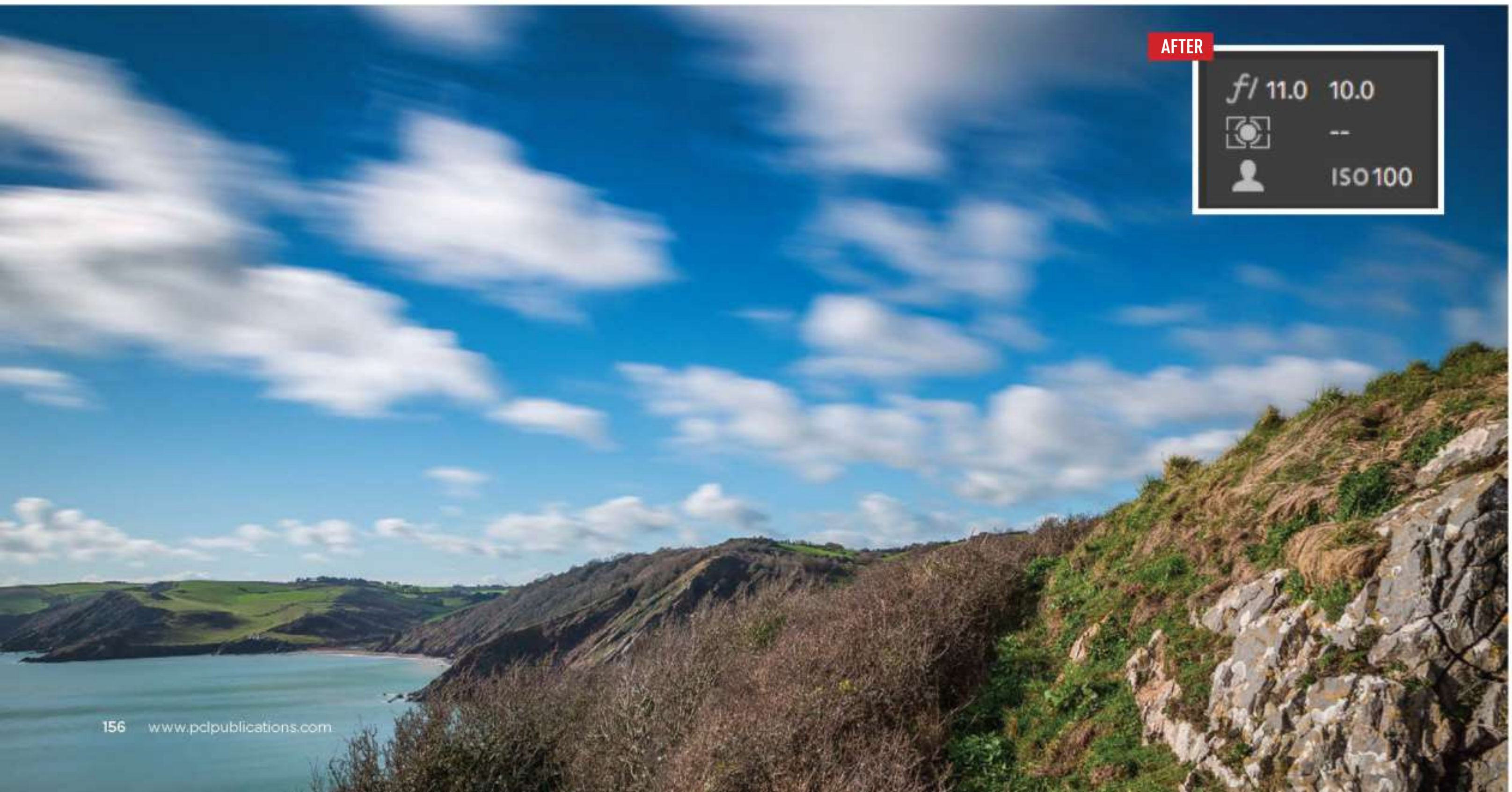
Neutral density filters

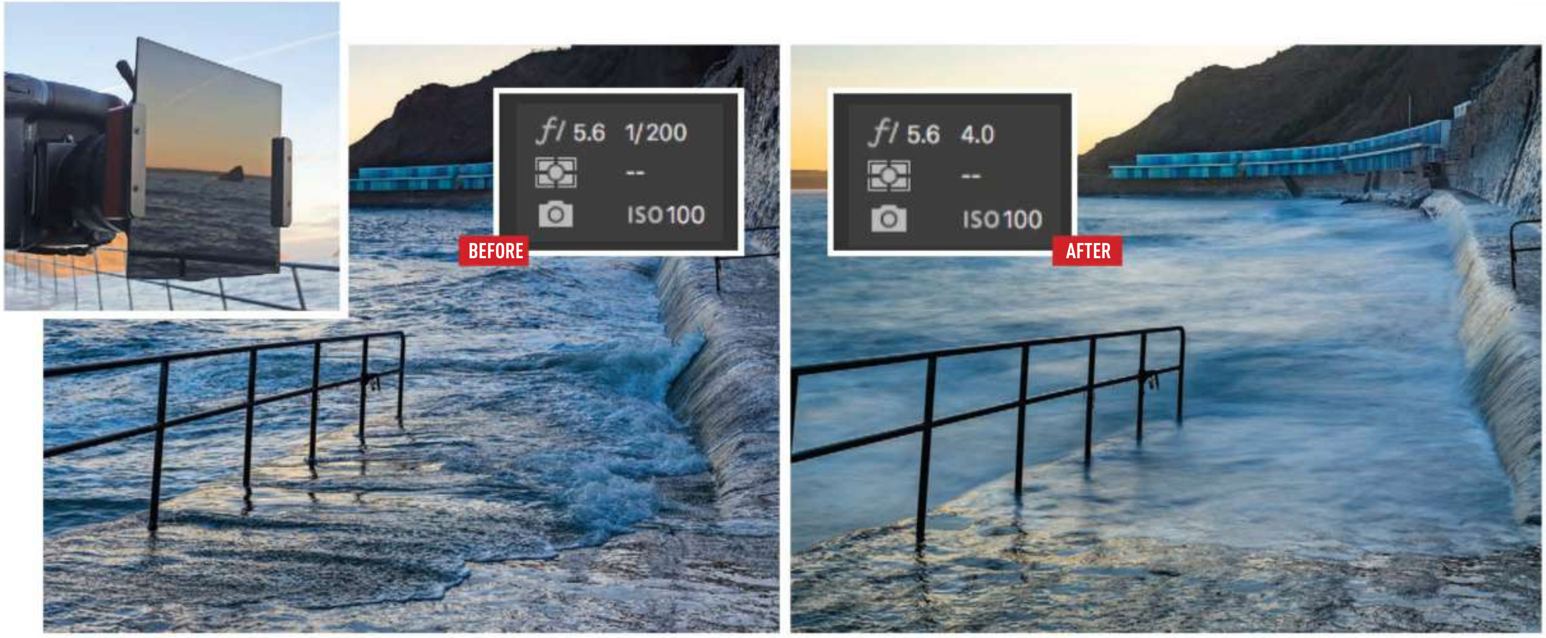
These filters, commonly referred to as ND filters, are essentially pieces of dark grey glass or resin, the neutral grey avoids imparting any colour cast onto the image and depending on how dark they are, these dark grey filters reduce the amount of light falling on the sensor. As a result, you are able to use much wider apertures and, if required, achieve a much shallower depth of field on very bright days. You can also use them to drive up exposure times while employing the creative application of blurred movement, such as waterfalls shot over many seconds, to reduce the water to a white mist.

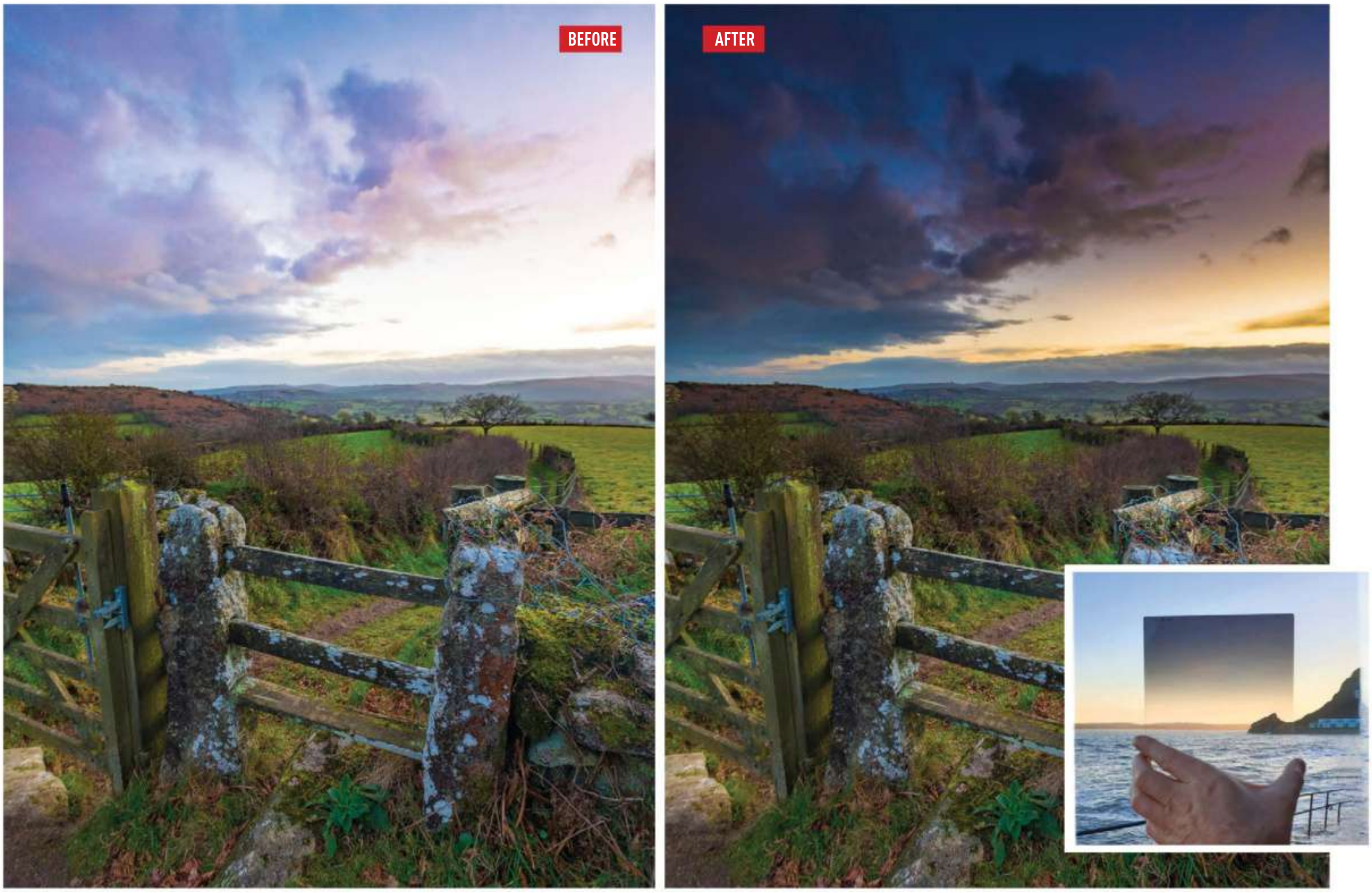
ND filters come in a variety of densities denoted by their ND number. For example, a 1-stop ND filter is called an ND2, whereas a 2-stop filter is called an ND4, 3-stops is ND8, 4-stops is ND16 and so on. They come in round and square formats since they don't need to move and the most popular ones, for general lighting conditions, are usually the 2, 3 and 4-stop filters, but you can also get ND1000 filters that can reduce light by 10-stops.



The moving clouds on a bright sunny day are softened considerably after the addition of a 10 stop filter drives up the exposure time into several seconds.



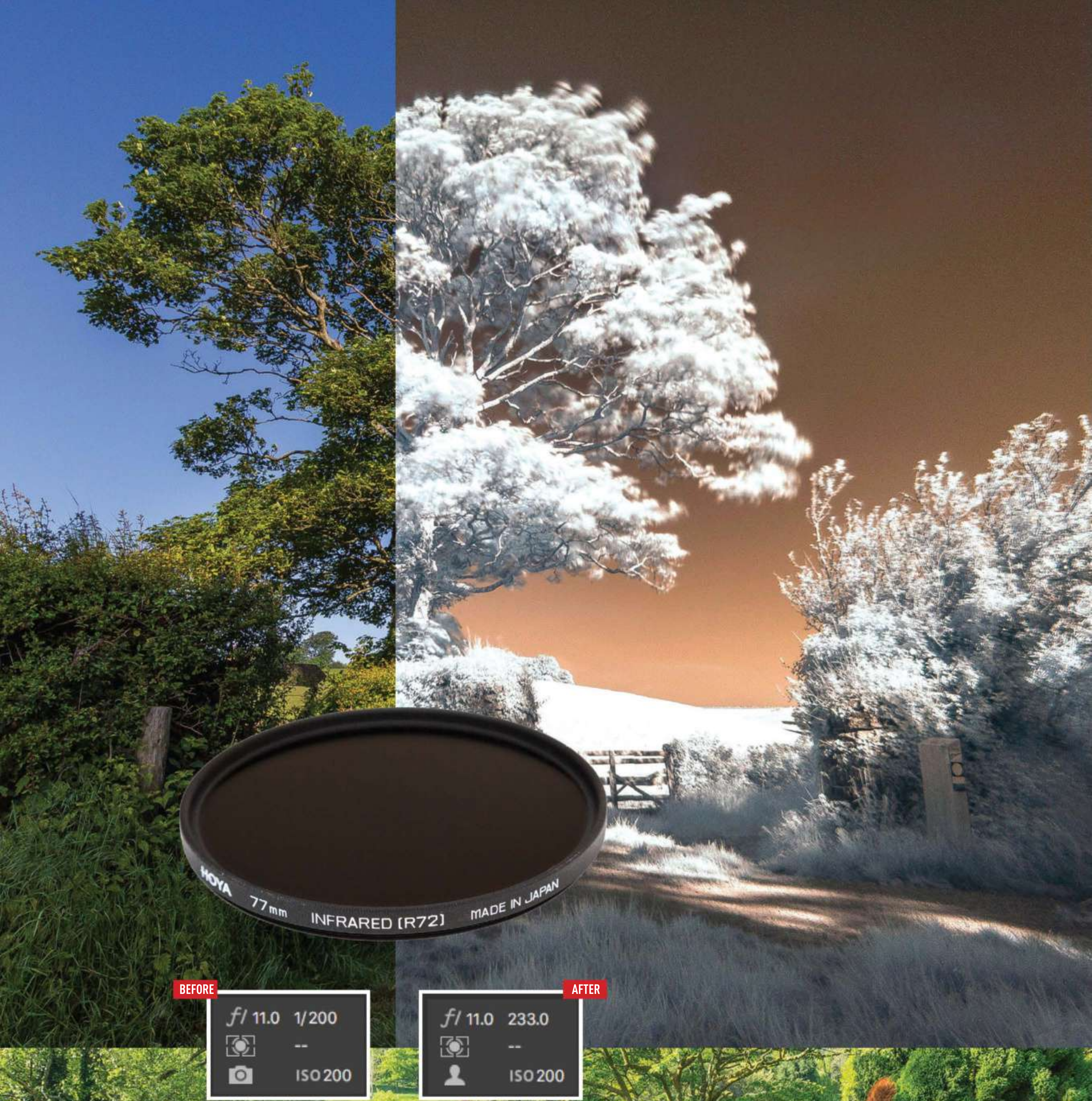




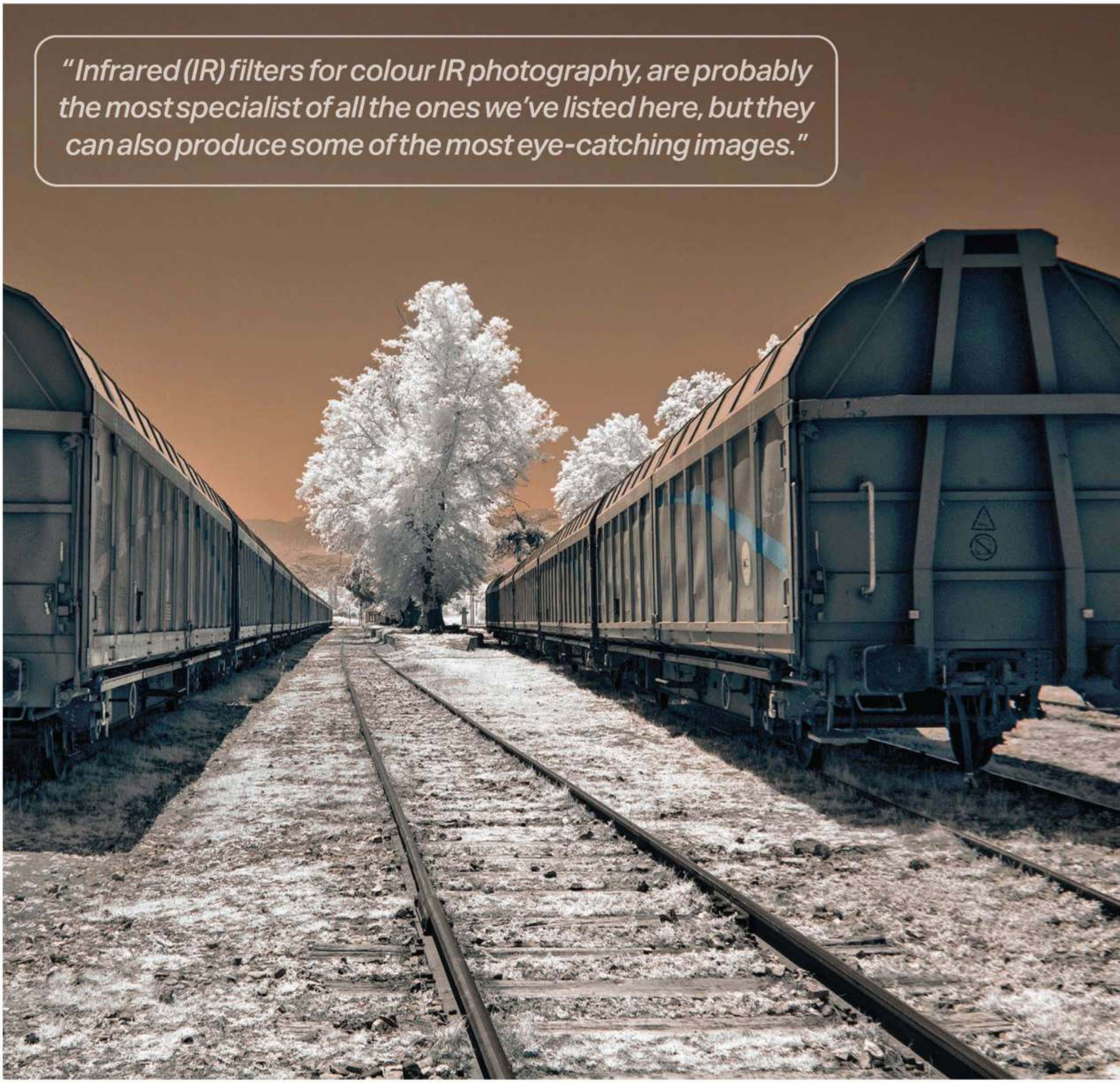
Graduated ND filters

Graduated ND filters behave in a similar way to their standard ND filter siblings, but rather than being a solid grey all over, they fade from dark grey at the top of the filter to clear at the bottom. This transition, from dark to clear, is very effective at balancing the exposure in a scene where you have a bright sky and a darker foreground. Landscape photographers love this filter as it helps to remove the necessity for shooting more than one exposure of a given scene, which is normally done in order to get a well-exposed foreground and a well exposed sky, then blending them together. Like the solid ND filters, they come in various densities and different transitions between the dark and clear areas; you can get ND graduated filters that transition very sharply from dark to clear, over a very short distance, and are good for landscapes where the horizon is free of any obstructions alongside ones that transition very gradually, over a larger distance, for shots where there might be trees or hills in the frame.

For most landscape work, a 2-stop ND grad is enough to keep the sky from overexposing, but if you are looking to shoot bright sunsets and sunrises, then a 3-stop ND grad may be more effective at balancing the overall exposure. Although you can get round screw-on ND filters, they can't be moved, so it usually easier to get the square filter equivalent so you can move it up or down in the holder allowing you to place the graduated part of the filter exactly where you want it.


HOYA
77mm
INFRARED [R72]
MADE IN JAPAN
BEFORE
f/ 11.0
1/200
--
ISO 200
AFTER
f/ 11.0
233.0
--
ISO 200

Canon
EOS



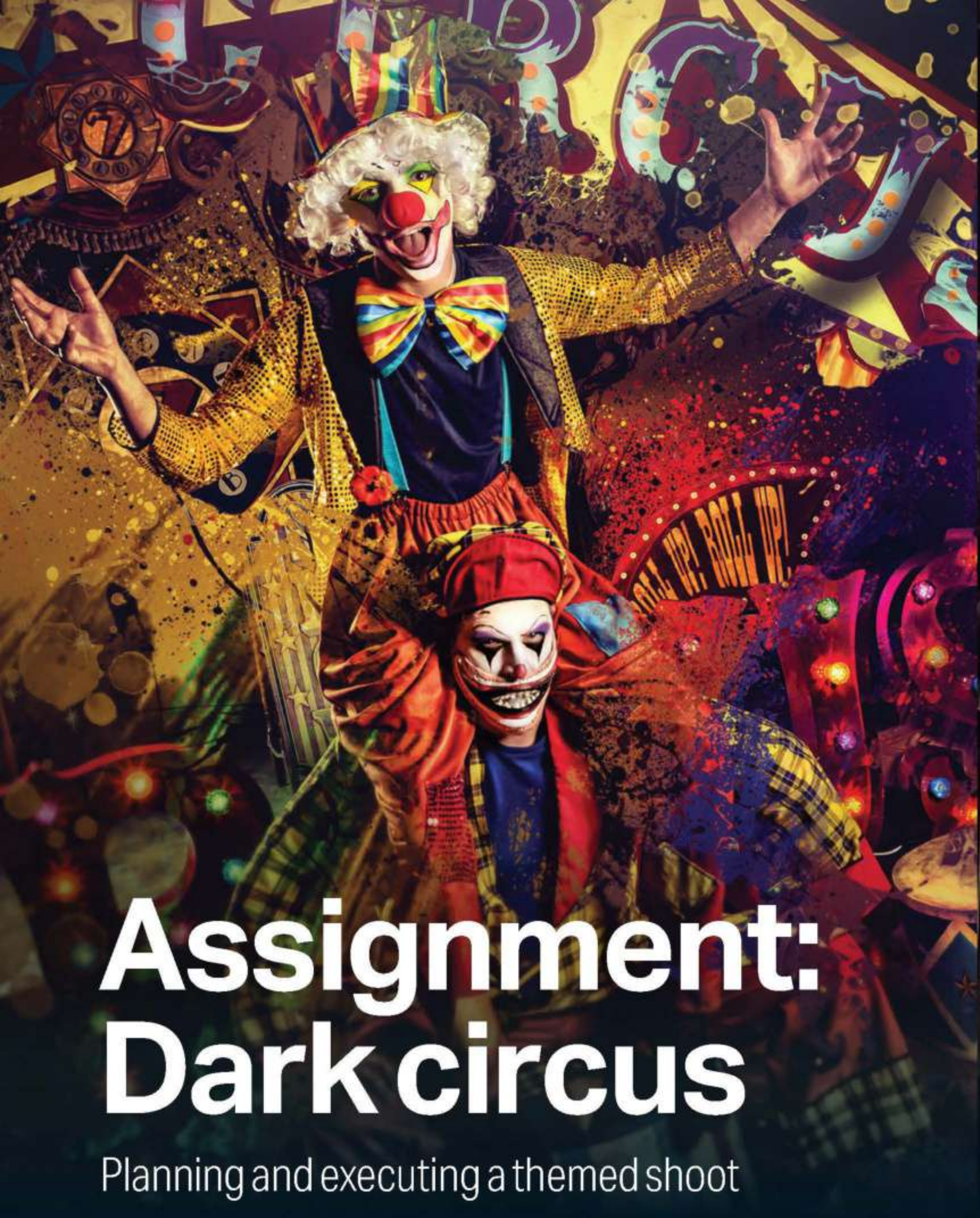
"Infrared (IR) filters for colour IR photography, are probably the most specialist of all the ones we've listed here, but they can also produce some of the most eye-catching images."

Infrared filters

Infrared (IR) filters for colour IR photography, are probably the most specialist of all the ones we've listed here, but they can also produce some of the most eye-catching images. An IR image out of the camera looks quite odd, blue skies are a dark bronze colour while green foliage is a milky blue colour, but after processing, they take on a surreal look that many favour. IR filters allow us to capture scenes in ways that conventional photography does not, they only allow certain wavelengths of light that are invisible to the naked eye to be captured by your cameras sensor. The human eye can only see light between 400 - 700nm (nanometers). A good filter to get going with, is an R72 filter that cuts out light up to 700nm, bear in mind these filters are incredibly dark, so long exposure techniques will come into play here.

Be aware that you may be shooting exposures lasting up to a couple of minutes with certain cameras. Some are better at capturing IR images than others, due to the fact that DSLRs have an IR filter that is designed to cut out these wavelengths to a certain degree, ensuring good image quality. Some camera's IR filters are stronger than others so you might need to check your own camera's IR capability before you start. IR filters come in a number of varieties from 850nm, 720nm, 665nm and 590nm. They are round screw-on filters and can be purchased in different thread sizes.

There you have it. That's our roundup of some of the most useful filters we think any photographer should keep in their gear bag. Shut down Photoshop for the time being, get yourself a couple of filters and enjoy being in full control of your camera and the light you're using to create great photos. ■


ROLL UP! ROLL UP!

Assignment: Dark circus

Planning and executing a themed shoot

Planning a themed photo shoot is a great way to explore your imagination and get your creative juices flowing. Once you have an idea, the prospect of planning and preparing for it can be quite daunting if you intend to start from scratch: sourcing your props and materials and finding suitable venues and models. However, the wealth of knowledge you pick up when planning your shoot makes the experience worth all the hard work; and the unique images you will create bringing your imagination to life makes it well worth taking up the challenge. Before you decide upon the nature of your shoot, it is a good idea to do a little research, to help you decide on a theme that interests you.

On this occasion we decided to do a Circus Shoot, since we have always been intrigued by the work of Diane Arbus, a female American Photographer who found beauty in people who would otherwise be deemed too ugly or obscure by the rest of society to be photographed. Many of her images were of circus freaks and the images were shot in black and white, making them stark and atmospheric. We decided our shoot was not going to be done in the same way, as we wanted a more modern style for our images and resolved to use plenty of colour but with a dark twist, to capture the personalities of our models. With this in mind, we began making a list of everything we were going to need. Three A4 pages later we realised this was going to be a big challenge but could not wait to get started!

Sourcing a venue and props

For this shoot to succeed it was vital to find an atmospheric venue that would allow for both ambient light and the use of studio lighting. We would also need plenty of space for the acts to perform (preferably with a stage) and ideally somewhere with a changing facilities where the circus performers and makeup artists could prepare. We were told about a new music and arts based 'Speakeasy' style venue that had opened called The Lucky 7 Club which sounded perfect. We contacted the proprietors to ask if they would consider allowing us to use the club. With a minimal budget for the shoot we asked if they would consider letting us use the venue at no cost and they kindly agreed, on the understanding that we would let them have a few copies of the images produced, to help promote their establishment. Perfect! We now had a fabulous venue. Collaborating with other businesses is a great way to source what you need for your themed shoots and also a great way to make new contacts in your local community.

Next we needed props, so we approached The Prop Factory, a Devon based company run by Carmen. She is a creative lady who along with her team create props for festivals, TV and all types of events. We had seen on her website that she had many circus props and also collaborated with photographers. Carmen kindly agreed to get involved with our project and so between us we set a date for the shoot.

THE BEST OF THE MIGHTY
MARENGHI FAIRGROUND ORGAN

Models, makeup and costumes

Once you have established a venue you will need to source suitable models and acts to feature in your images. Sourcing models can be expensive if you decide to go through modelling agencies, so if you do not already have models that you work with regularly, an alternative can be to advertise on social media sites. This is not only a great way to find models but also one of the best ways to gain exposure for your images after the shoot and encourage other models to work with you. If you do not have your own page set up already to advertise on, there are plenty of Model & MUA Networking Groups on Facebook, where models and makeup artists advertise their services. Most of these people are trying to build a portfolio and will offer their services in exchange for images to use in their portfolio. On this occasion we used models and stylists already known to us, as we needed models with circus skills such as Hula Artists, Contortionists and makeup artists with the skills to create the looks we wanted to achieve for the shoot.

Many of the costumes were sourced from eBay and charity shops and some were made for us by family members; if you do know people who can sew, then try and get them on-board. Having unique exciting costumes will add volumes of interest to your images.

Creating the team

To communicate, we created a Dark Circus Facebook Group. All of the models, makeup artists and stylists, in-fact anyone involved with the shoot were added to the group, so that we had a great platform to communicate on. This was somewhere we could share times and schedules for the actual day and also somewhere to discuss the ideas for all the individual images. The group formed a great community spirit with many of the models themselves, sharing their own ideas for the characters they were playing. Creating the team is a vital part of any group shoot. If all the participants are invited to project their ideas and contribute, it creates a great community spirit and breaks down any communication barriers. Everyone involved in your project will feel part of the team, encouraging new relationships and bonds which will result in a great friendly atmosphere on the big day.

Behind the scenes shots

Taking photographs behind the scenes is a great way to prepare your models for the shoot before it happens. Getting used to the camera pointing in their direction will help them get in to character prior to the start. Walking around taking shots of everything that is going on behind the scenes breaks down barriers and encourages communication between the photographer and models. This is also a good opportunity to discuss various ideas with individuals for poses and facial expressions, so that they have some idea of what is expected of them during their individual slot.

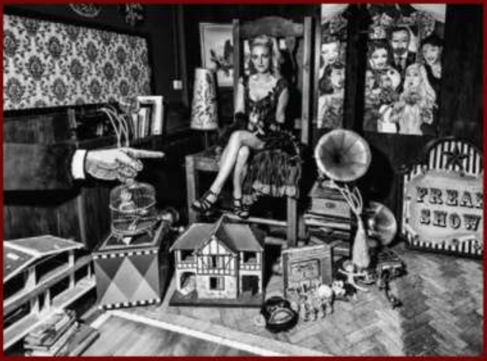
Taking behind the scenes shots makes a great record of what is happening during the course of your themed shoot and for future events, a great reference to look back on to remind you of what worked, what could have been done differently and how your planning timed out.

Long lens

Using a telephoto lens while obtaining behind the scenes shots is a great way of keeping your distance when capturing candid moments as they naturally occur. For our circus shoot we used a Canon 90D and for the candid behind the scene shots a Canon EF 70-200mm f/2.8L lens was added. The wide maximum shooting at 2.8 meant we were able to take photos in poorly lit areas of the dressing room without the use of flash. This is a fast lens and along with the vibration reduction we were able to use it without a tripod, which would have been in the way with all the hustle bustle of everybody getting ready.

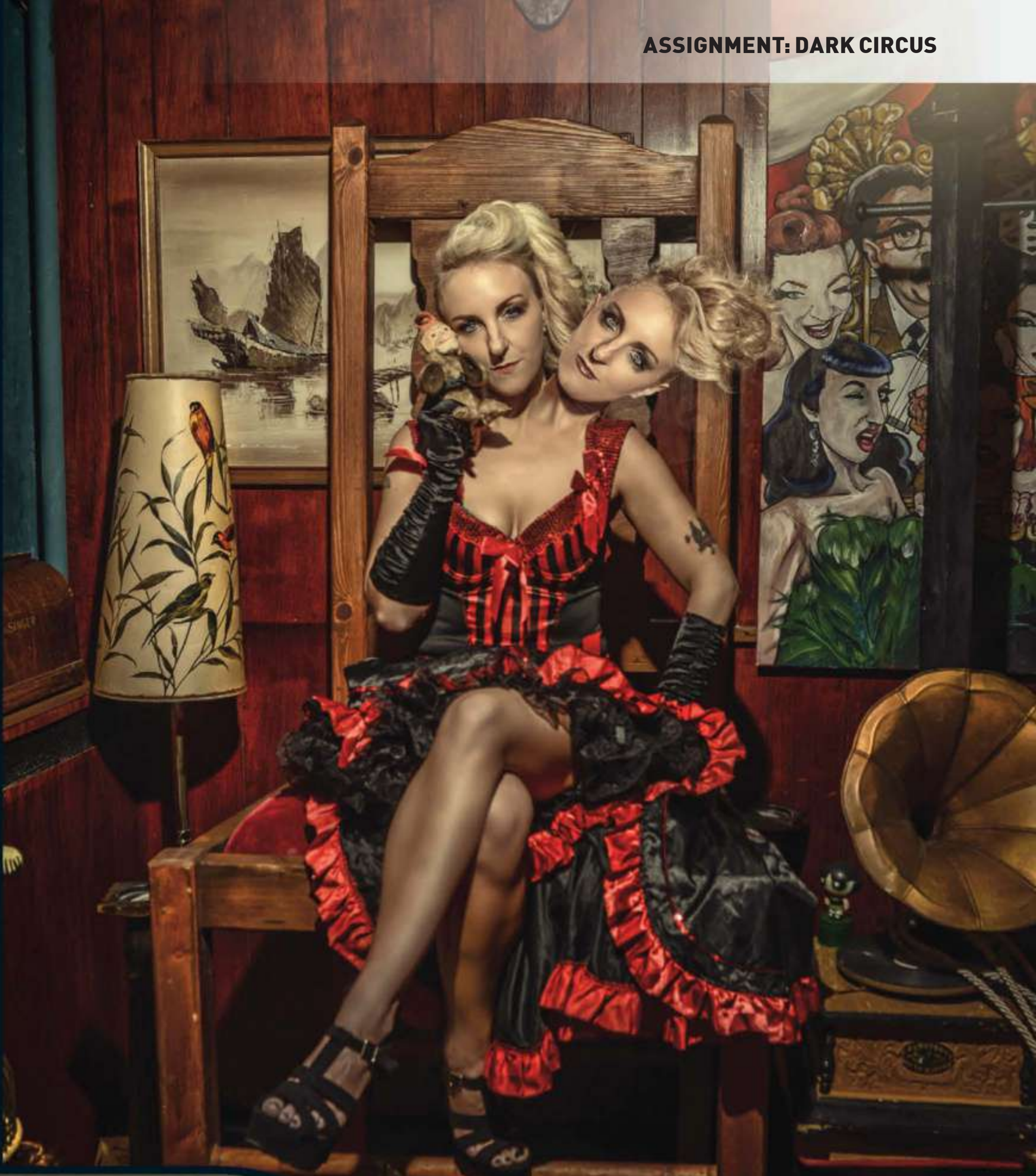
An eye for details

We also made use of the time we had, while the models prepared, to capture images of some of the props, artwork and curiosities within the club. Collating pictures of items that could be used as layers, backgrounds or brushes meant that later, during the editing process while creating composite images, we had the tools to make images that captured the atmosphere and details of the place where we were shooting.



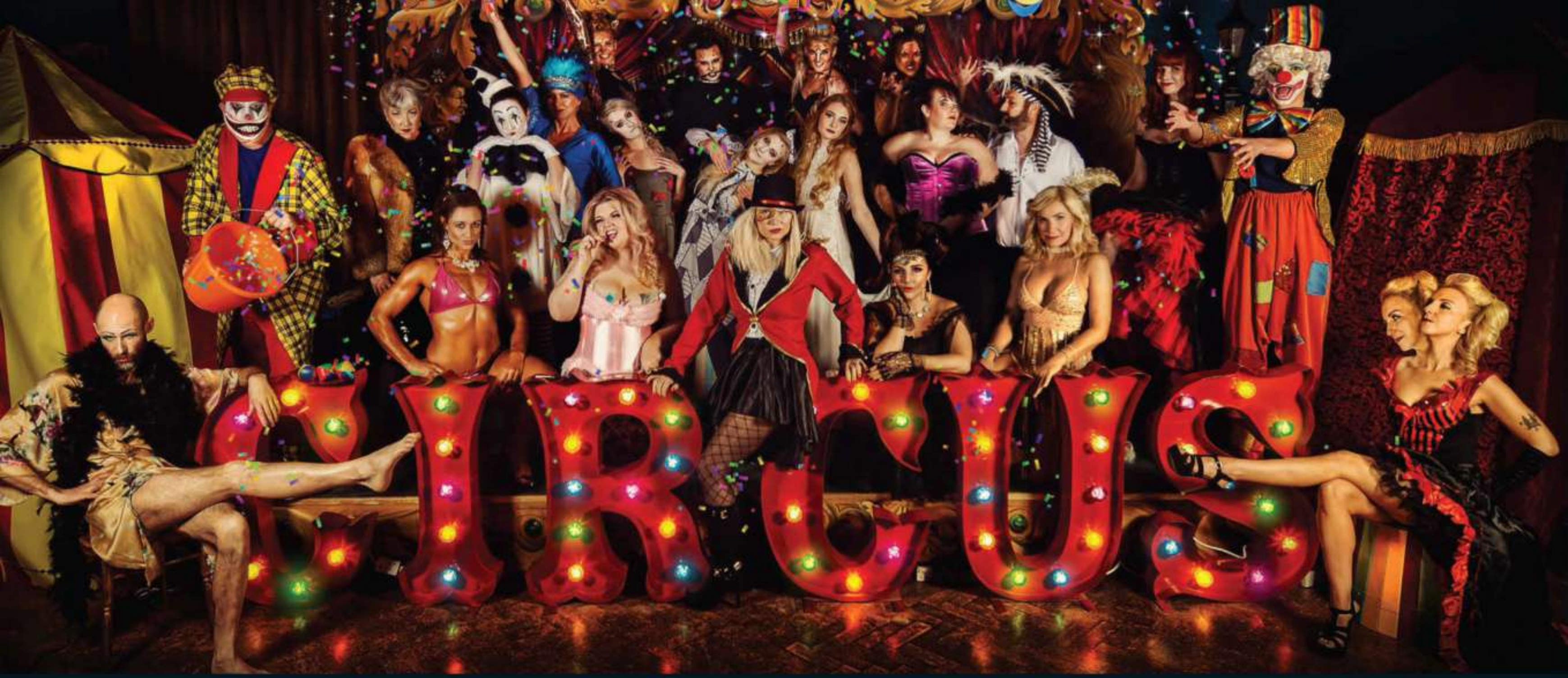
Lighting our models

We decided that we would create a set of 20 images covering a variety of circus characters. The first of which would be Siamese Twins. This would be a composite image, allowing us to use 2 different images of our model Hayley's head edited into one final image in Photoshop. Using a selection of props including a giant chair, a gramophone and various children's toys and curiosities we found at The Lucky 7 Club, we set to work creating an obscure setting that our unusual character would look at home in. Our stylists Laura and Sammy set to work creating two different looks for our model, as we wanted both heads to have a different style in each image so that they did not simply looked duplicated; instead implying different personalities. The corner of the room we had set up in was fairly dark. With dark blue walls clad with wooden panelling and parquet flooring, we did not want to lose the atmosphere this environment created, so we decided to use a hard directional light to make shadows that would create drama and a sense of mystery, and not flood the area with light. To do this we used Elinchrom D-100 lights. These are small but robust 100W flash units which will power up again after one and a half seconds. The beauty of these lights is that they are quite compact and perfect for the area we were working in. These flash heads are portable and easy to set up and another benefit to this small light is that they are quite inexpensive; this is always a good thing when you are in a busy environment or out on location where accidents can happen. Being a small light helps create a harder light with shadows and is what we wanted to achieve during this shoot to create drama. If you want to achieve an even harder light, use smaller lights. However, a D-Lite 100 system will give you approximately twice the power of using speedlites. To achieve the look we wanted, we opted for a hard directional light, positioned high; in fact as far up as we could get away with while still capturing the highlights in the subjects eyes, combined with a fairly narrow depth of field. Using the elevated position of the light, similar to butterfly lighting, we cast shadows in the right places, i.e. under the cheekbones and the chin, which helped to cast shadows and define the models facial features. Using a light pointing in to an umbrella (positioning the umbrella fairly close to the bulb) and shooting forward to the subject, will achieve a hard light similar to that used in Hollywood lighting, and using the umbrella in this 'shoot through' way helps to get rid of any stark overly exposed areas, like a diffuser would. We decided to use this modifier in preference to using a soft box or beauty dish, which produces a much smoother flatter light and in turn takes away from the shape and definition of the face made by the shadows.


Clear concise direction will encourage your models' confidence and help them understand what is expected from them to achieve the images you wish to create.

Once our lighting was set we selected a 24-70 lens, which is a great all-rounder for wide captures, portraits and everything in between, that gave us flexibility in the type of images we wanted to try.

Hayley is an experienced model so had no problem understanding our requests. However, many models are not so confident and so clear concise direction from you the photographer is paramount in achieving the photographs you are visualising. For this image we needed a selection of head positions ready for creating our Siamese twins look during post production; and then adjusted our light direction accordingly for each new pose.



Organising the shots

Prior to shoot date one of the things we had discussed in our group was which characters we would need and the finer details of our characters' personalities. Discussing some of the personality traits and expressions that the models could inject into the roles of the characters, helped make the images more believable and helped our models relate to the role they were required to play. The 20 images we decided on for the actual day were based on our memories of visits to the circus as children, as well as TV programmes and films we had seen previously.

Given that we had 17 shoots to complete, 3 being photographed in separate venues, the time management of our shoot was paramount. We had use of the club from 9am until 5pm but had to allow for a lunch break as well as time for the models to get ready with the help of the stylists. This allowed us approximately 6 hours to do 17 shoots or 20 minutes per shoot.

In order to stick to such a tight schedule a floor manager was delegated (Rosie) who also doubled as our ribbon trapeze artist. Her job was to plan out a schedule that gave each of the models time to have the hair, makeup and wardrobe done, and a time for their shoot. It would be fair to say that without Rosie making things run like clockwork through the course of the day our shoot would have been a disaster, so I would very much recommend that you consider an assistant when planning your themed shoot. This frees up your time to concentrate on the creative side of things like taking the pictures.

Working with stylists and makeup artists is much like working with models: they are not mind readers and require a certain amount of communication on your part to achieve the looks you want them to create. Discussion prior to the day, researching looks and discussion ideas for the styling of each of our models, meant that not only did our stylists turn up knowing what was expected of them but they also had plenty of time to source the materials needed for specific make up styles. Any planning for your shoot that can be done prior, should be done in order to take away stress on the day.

Time management on the day is one of the most important factors to take in to consideration when planning. It will not only alleviate stress but structure the day, so that you the photographer and models alike can work efficiently in the time slots given.

Story telling images

The most successful images are ones that are thought provoking and captivate the imagination of the person viewing them. With this in mind we wanted each of the images to not only be exciting and colourful but also to tell a story, much like the circus images by Diane Arbus that had inspired us to do this themed shoot in the first place. The images had to have depth that went past what you see at a first glance. Therefore, a lot of time was spent creating concepts and stories behind each of our images. Each of the images we created tells a story of its own.

The strong man

To give you an example of what we mean by a story telling image let's take the concept of the 'Circus Strong Man', historically portrayed as a robust male character, very muscular and often holding a glamorous assistant with one arm up above his head. How could we create a story telling image with a modern day slant, to illustrate the same concept, without falling in to this already portrayed image style? Firstly we thought about the character itself and decided the first change we would make was to use female models instead of the stereotypical man. We then thought about the word 'strong' itself and what it meant to us as a group. For the most part we decided it was a word to describe someone with physical attributes that made them appear very fit and powerful, so we needed to find a model who was physically fit and preferably with a bodybuilder type physique. We then discussed our concept further and went on to discuss mental strength and a completely different meaning of the word 'strong', such as someone

LUCKY 7
BANG

Expect the Unexpected

With all the planning and preparation in the world, invariably there will always be a few things on the day of your shoot that you did not see coming. Learning to adapt and be flexible with your arrangements is a great skill to have as a photographer. When working with a large group of models for instance there may be people on the day who are unable to make it due to illness or perhaps their childcare has let them down, so having a plan B should these situations occur will put you at an advantage. Sourcing versatile models who are willing to step in to another's role is advantageous; and if you are not too bad at hair and makeup, be prepared to roll your sleeves up and get your hands dirty. Inevitably with lots of different costumes being stretched in to different poses and positions there may be a few tears and burst buttons, so a little emergency kit containing items such as safety pins, cotton and thread, change for the car parking meter and a list of models and contact phone numbers will come in very useful on the day.

who needs to be strong to cope with daily issues. We discussed different examples of people who have been strong in their own lives and who cope with a variety of different circumstances, illnesses and social pressures.

We found our two perfect models: Carrie, a fitness instructor with a strong independent character and an incredible physique; also Claire, a Pilates instructor with stage 3 breast cancer, who shows strength on a daily basis fighting her illness and maintaining a strong mental attitude. We had found the story behind our picture. A strong person isn't just someone who appears to be fit on the outside, a strong person is someone who is coping and showing bravery in the face of adversity too: someone like Claire.

Post production

How you decide to edit your images post production will determine the final appearance of your images and as a photographer this may be what sets you apart from others in the industry; you may decide that a few simple tweaks to the white balance is all that you want to do. However, for our Dark Circus shoot we decided to push our creativity one step further and use creative Photoshop techniques to enhance the images. For this final challenge we decided to take our imagery to a whole new level by creating a set of portraits by applying prints to three dimensional casts of our models faces. There are many great plug-ins available on Photoshop that create artistic finishes for your photographs and one of our favourites is Nik Software, which can be downloaded free of charge from Google. This has a selection of applications including: Colour Efex Pro, Silver Efex Pro and Analog Efex Pro. For the Circus images we wanted to create a dated finish with muted colours and so I adjusted the settings in Analog Efex Pro to create the desired effects.

Learn from your mistakes

The best way to learn how to create the perfect themed photoshoot is to have a go. There will be ideas you had prior to the shoot that will not go to plan and some of your greatest ideas will come to you during the shoot, when you are inspired by the people you are working with and the environment you are photographing in. Learn from your experiences, be encouraged by your successes and do not be defeated by the things that don't go to plan. Learn from the experience and plan another shoot. You are now armed with the tools necessary to improve on your first attempt and know what needs changing. Remember there aren't any rules to being successful: preparation will help but ultimately the success of the day will be down to how you conduct the event. If you are enthusiastic, so too will your models and stylists. If you have a vision, and follow it through, you will

TEST YOUR STRENGTH
100
90
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60
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20
10
RING THE BELL
P CORN

create images bespoke to you, as well as creating great memories of a day that everyone involved will remember for a long time to come. ■

Credits

Many thanks to:
THE PROP FACTORY - www.propfactory.co.uk
THE LUCKY 7 CLUB - www.thelucky7club.com
ONYX - www.onyxaerialfitness.bco.uk
MUA: Estelle Cole - www.belush.co.uk
MUA: Jodie Boulter - Bronzed Beauty
MUA: Deb Miller & Holly Shears
HAIR: Sammy Bond
HAIR: Laura Lewsey - Hair Addiction
VIDEO: Nicky Simpson
COSTUME: Jan Drayton
DIRECTION: Rosie Cawthorne
ASSISTANT: Charli Miller
MODELS: Paula Valpy, Hayley Prescott,
Deb Miller, Rob Miller, Alana Miller,
Hannah Williams, Carrie Darby, Claire Street,
Rosie Cawthorne, Emma Green, Monika Haglundh, Estelle Cole,
Kyle Shorland, Shaun Rogers, Kim Platts, Erin Collins, Holly Shears,
Jodie Boulter, Zoe, Bowden, Abi Woltman, Sarah Bell & Mark Bell.

AVOID COMMON PHOTOGRAPHY MISHAPS

Some guidance on how you can improve your photos

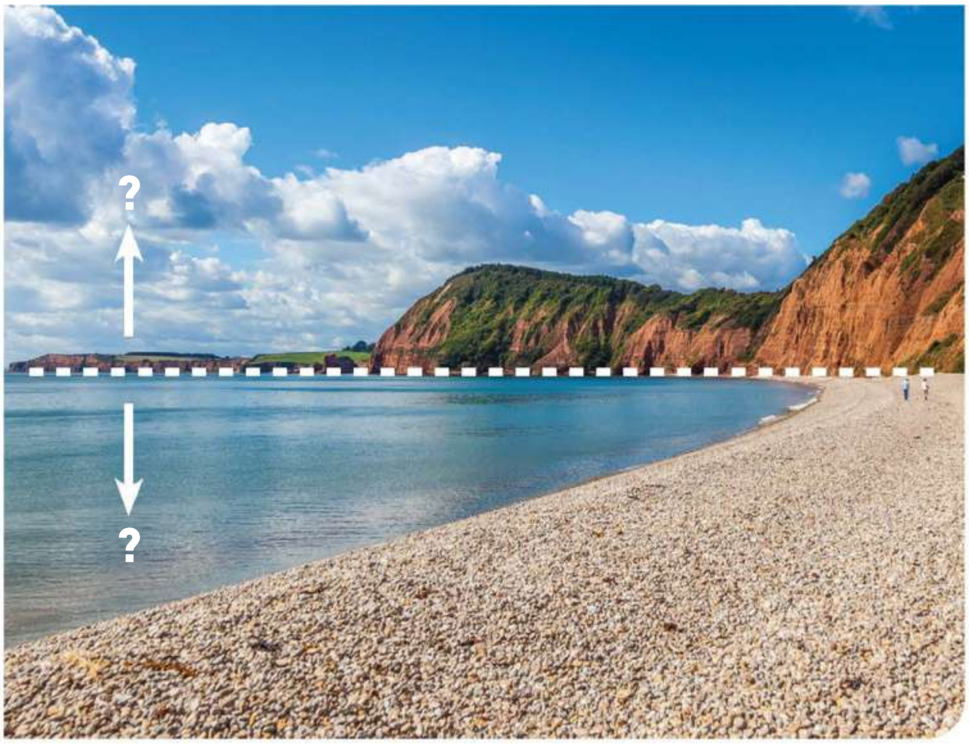
Are you a new photographer? We all have to start somewhere and chances are you're not going to be creating sensational photographic works of art the moment you turn your new camera on. Despite professional photographers wanting us to believe it, they are not all born perfect masters of their art. Mistakes happen, lessons have to be learned and experience has to be gained. You don't just have to be a newbie to make mistakes, anyone can do it. You are not alone. Let's run down some of the things that you should be aware of to ensure that your images will improve. ■

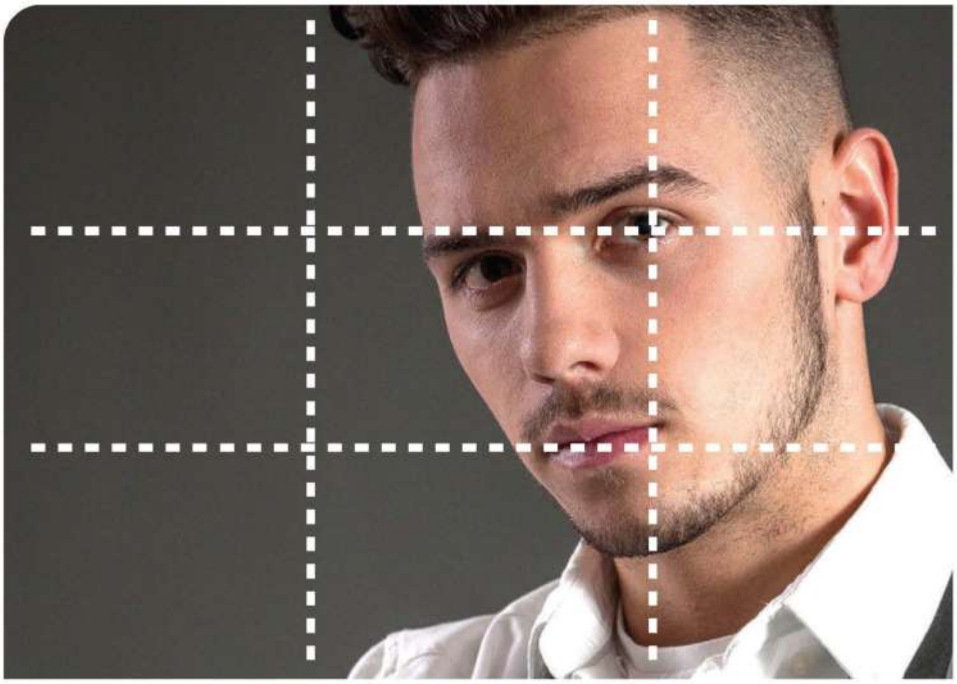
168 Essential tips and advice to help you avoid common mistakes and improve you photographic skills

174 Taking care of your equipment - Keep your gear in tip-top shooting condition with our handy tips

Stuck in the middle

New photographers may find themselves making this first error quite a bit. It concerns landscape photography generally. There is often the urge to take a landscape shot and place the horizon line right in the middle of the frame. This will divide the image in half horizontally. At first it might actually feel like the natural thing to do but the viewer of the image is left wondering which half of the image is the point of interest. Placing the horizon line on the lower third of the photo makes more of the sky visible and this guides the viewer to scan the sky. If you place the horizon line at the top third of the image, then it is more obvious that the ground is the subject since more of it is on show. Dividing the image up into thirds horizontally and vertically, and placing key subjects in your photo on the points where they intersect or on any of the dividing lines, is an age old guide for composition known as the rule of thirds. It is one of the things that you will get to hear about more as you progress as a photographer. One thing to note about 'guides' and 'rules' is that they are just that. They are suggestions, not necessarily cast in stone. If you, the photographer, want to break the rules, then go ahead and break them; take the photos that make you happy.



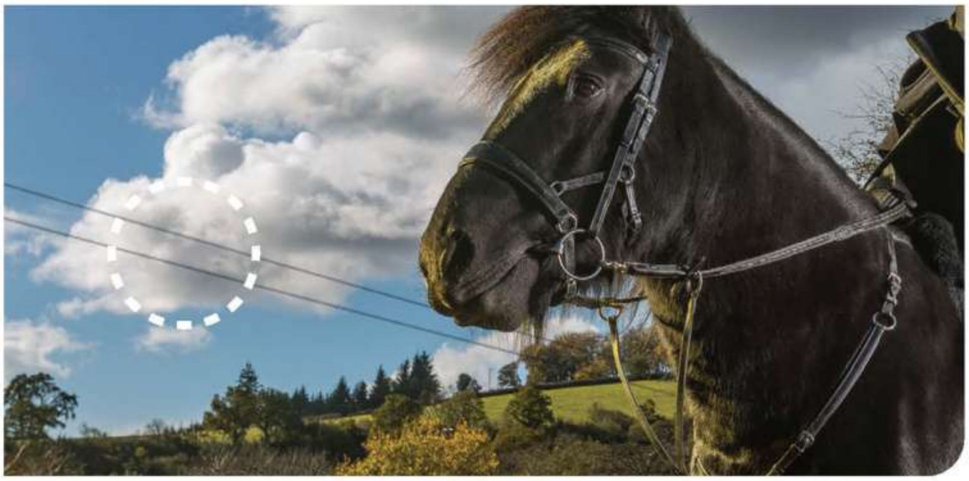


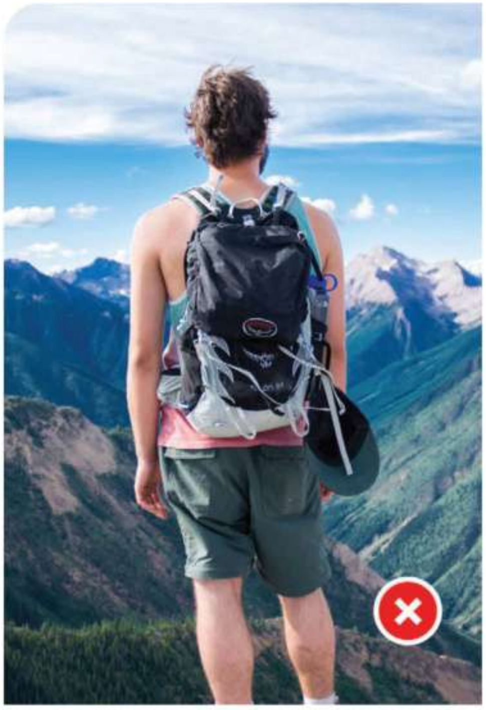
Vertical positioning

If placing your landscape photo's horizon line on either the top or bottom third of the frame is regarded as good form for landscape photos, then shooting portraits has its own suggestion for creating balanced compositions too. Much like shooting a landscape, the chances are that if you have shot someone's portrait, you may have placed them in the middle of the frame. This is not so much of a problem if you have taken a photo of them with the camera in portrait orientation and framed them quite tight for a head and shoulders portrait. If you are trying a landscape orientation photo it is often a good idea to place your subject on one of the vertical third lines. This will place them off-centre to the right or left depending on which line you use. Conventional wisdom tells us that this is a better composition but you, the photographer, have the right to disagree with this if you choose. Bear in mind that there is also the direction your subject is looking that may dictate which side of the frame they are placed. The general rule of thumb is to place them in the frame in such a way that they are looking into the space on the other side of the shot. You can experiment with this to see if it works for you.

Diverting attention

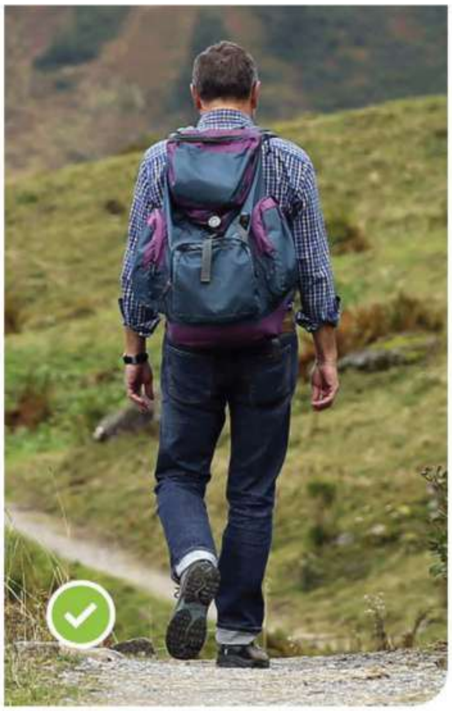
This can often be a classic error perpetrated by many photographers of different skill levels. In many cases, it can be that you just didn't see that telephone line running through the back of the shot or the lamppost that is sticking out of the top of your subject's head. Often, you can be so absorbed in framing your subject, that you miss those subtle but annoying background diversions that can ruin the shot. Yes, get your subject composed in a way that pleases you, but also take a moment to look around the frame of your composition through your camera viewfinder or live view monitor screen. Is there anything that diverts attention away from your subject (and not in a good way)? Can you reframe the shot to remove those distractions from the photo? If so, do it.





Slice and dice

Cutting parts of your subjects off in a photo is another thing that a lot of us have been guilty of doing in the past. In many cases, it is the removal of feet that is a typical thing to do. If not feet, it can often be the top of someone's head or a hand near the edge of the frame. It isn't restricted to portrait photos, it can happen in general landscapes as well. Shooting an interesting church and lopping off the church's spire or removing the top of a tree in a landscape is common. Of course, it may be that your lens isn't wide enough to capture the entire scene from that particular position. You may have the option to move further away, if you have room, and reframe the shot. If not, then you have to make some decisions that include the deliberate cropping of your subject. If you slice off a small amount off a subject it can sometimes look like an accident and you weren't paying attention to the crop. If you deliberately crop much tighter, it can then look much more deliberate and a creative choice on behalf of the photographer. With people's legs for instance, cropping off less than a third of their leg looks like a bad mishap but cropping off two thirds or more of their leg seems to work.



New camera, better photos

Have we not all been a little bit guilty of lusting after the latest camera tech in the hope it will suddenly transform us into amazing world-class photographers? It is an oversimplification but the camera doesn't take the photos, the photographer does. The latest camera may have a few more pixels, it may be able to shoot a few more frames per second in burst mode and it might have a higher max ISO than your own camera but it is an inanimate object. You have to take the photographs and you need to have good technique to get the best out of your shots. No camera in the world will save you if you can't capture a well-exposed photo. Automatic mode will get you so far but you will need to learn the ropes if you want your shots to be noticed amongst the blizzard of average photos out there. Even humble compact cameras can take great photos. DSLRs that are years old will still be able to take amazing photos if the photographer using it knows their stuff.

Canon
EOS 7D

A new angle

You pick up your camera, hold it to your eye and take a photo. Seems pretty straight forward. For many shots, that camera angle is absolutely fine but as time goes by, you will have a library of shots all taken from head height. Don't forget to experiment with different camera angles. Many new photographers can get used to shooting in landscape orientation only and may often just forget that the camera can be turned on its side for taking portrait orientation photos. Another simple one is to drop the camera to the floor and shoot up from a very low angle. This change in perspective can add a great deal of variety to your visual repertoire. Don't be afraid to experiment with new angles. Shoot down from higher vantage points, get your camera on the level of your subject particularly if it is a child or an animal, just keep adding different angles to the mix, even if you end up using the first shot taken at eye level. Next time, that low angle might just be the killer shot you need.

Really use the camera

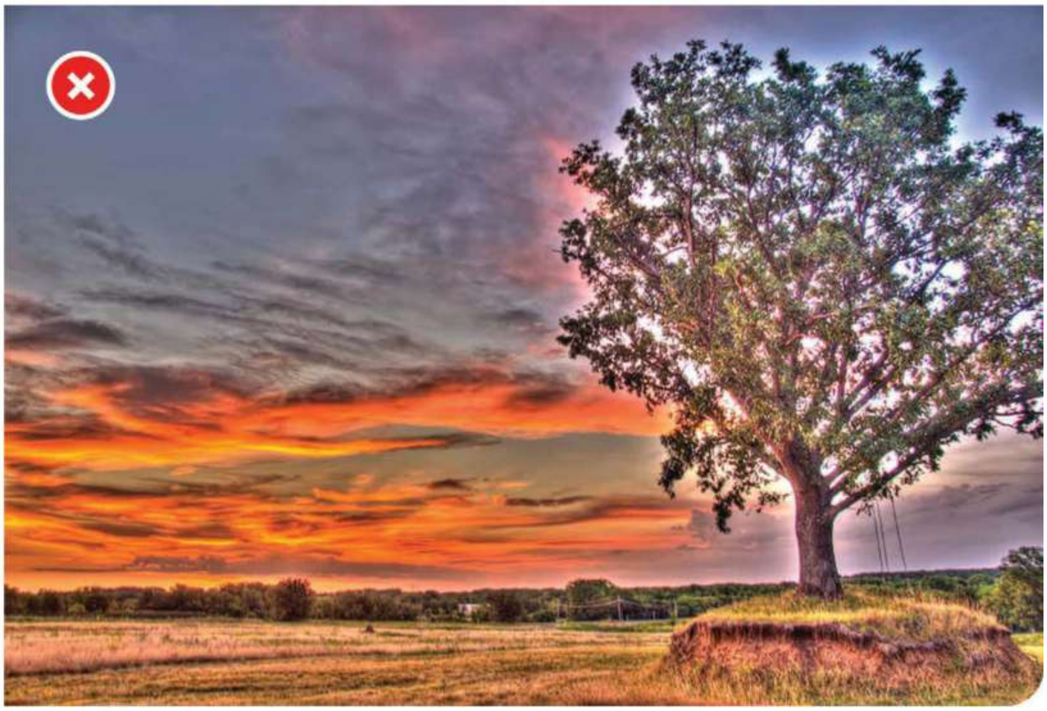
Don't keep the camera on auto. You have an amazing piece of imaging technology in your hands so use it. If you don't know enough about it, then spend the time and learn how to use it. Learn about aperture, shutter speed and ISO and how they all interact with each other and you will not regret it. You will have total control over your images and the camera will not have control over you and the choices you want to make. If you really get a good grasp of the basics, then the whole world of photography really opens up and you will be using the camera to its full potential. You will make some mistakes, we all do. A classic is to set your lens to manual focus for a very particular subject shoot and not switch it back for other shots where autofocus is required. Another is using manual settings for a shot and then shooting with those same settings in a different lighting situation but not looking at the results on your camera's monitor screen.

Just ask

A common issue for newbies is not having access to a mentor or another experienced photographer that they can talk to. If you are out shooting at a location where are other photographers around, why not go and have a chat with them? Photographers are a genial bunch and happy to chat about the subject and share insights and help newcomers who are trying to get to grips with their cameras. Think about joining a local photography club. You will be part of a larger group of like-minded enthusiasts who usually plan photo expeditions and go as a group. This is an excellent way to learn the craft. It just requires that you, the photographer, are comfortable enough to go and ask for help and advice when you need it.

Easy on the post-work

This one can separate the newcomers form the pros. Post-work allows you to take that photo and wring every last bit of detail out of the shot to make it the best photo it can possibly be. However, it is also possible to over process the photo and turn it into a lurid over-sharpened version of the original. Take your photo and then, at the post-process stage, add subtlety. Yes, you can add saturation, contrast and sharpness, but learn to see when you've taken it too far. One area that suffers the most abuse is the world of HDR photography. HDR (high dynamic range) photography requires the taking off several photos of the same scene but at different exposures. These are then combined to create images that contain much more tonal range than a single photo. However, those new to HDR can often go so far overboard with the processing that images are created that can give the viewer a migraine at twenty paces; again, subtlety is the key. Try to become another photographer who can save us from too many horrible HDR photos.



Light fantastic

In photography you may hear reference to 'the golden hour'. For gorgeous landscapes you cannot do better than to shoot at sunrise and for an hour or so after that; or at sunset and the hour or so before it sets. The light has a luminous warm glow, shadows are long and show off the contours of the land. The sky ignites in pink, orange and red hues and if you catch a sunrise or sunset with an interesting set of cloud formations, then all the better. It may be your creative choice, but try to avoid midday shooting. The shadows at midday are harsh and sit directly beneath objects in the scene. Shadows reveal shape and form, so always think about the time of day you choose to shoot at.

Dramatic conditions

During the year, there are always likely to be periods with high winds. There are often some dramatic photo opportunities to be had down by the sea. Why not get down there at high tide and check out the wave action? High tides and windy conditions can create some epic crashing waves. Whether they are crashing over a sea wall or smashing into rocks and cliffs, they are a sight to behold. It goes without saying, but we will say it, always keep yourself safe. No shot is worth getting washed out to sea for.

A golden rule

It can't be stressed enough, if you want the best from your shots, you need to switch to Raw shooting mode. This is an important consideration for the new photographer, since many will continue to shoot in jpeg format and never be aware that they can use the Raw format if their camera supports it. Most modern cameras now allow you to capture your images in Raw format. Raw as the name suggests is the uncompressed and unprocessed image data straight from the camera's sensor. The files are much bigger than their jpeg counterpart but they give much greater latitude when it comes to processing your final image.

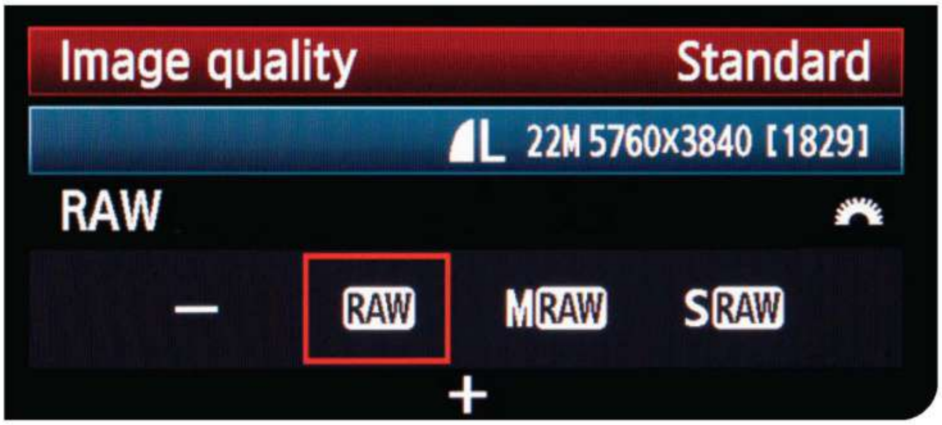


Image quality Standard

L 22M 5760x3840 [1829]

RAW

Spring cleaning

Why not spend some time removing unwanted photos from your hard drive and back them up to a portable USB drive. You'd be amazed at how much space you can recover on your computer by pruning out all the unwanted shots you've accumulated over time. We recently totalled up how much space was being taken up on our hard drive with photographs. It came to over 500GB. We reckon that over 80 per cent of the shots weren't being used and that would save an enormous amount of space. Moreover, we did a grand total of everything currently backed up and it came in at over six terabytes!

City at night

The crisp, clean air of spring can often lead to very clear nights. Take your favourite camera, lens and tripod and go out and shoot some night time urban scenes. If you are looking at capturing a city skyline, you can actually shoot after sunset whilst there is still some light in the sky. This is known as the blue hour and cities look amazing shot against the deep blue of approaching darkness.

Long exposures

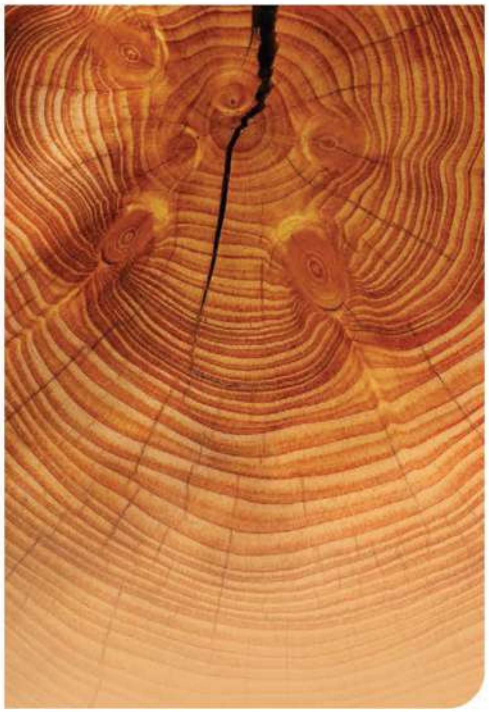
Another idea for a crisp, clear night is to shoot a long exposure image that captures the movement of the stars. You will be working in the bulb exposure range from 30 seconds up to tens of minutes. A robust tripod is essential for theses 'bulb' shots. The shutter will be open for a long time and you don't want your camera moving part way through and ruining the shot. A programmable cable release is also a great purchase so you don't have to sit there for ten minutes with your finger on the shutter release button.

Morning dew

A clear and cold night can make for a lovely dew-covered morning. Make a point of capturing flowers and leaves covered in dew by using a macro lens to get in very close to your subject and reveal their beautiful and delicate patterns. The light of the morning sun, low on the horizon, can be used to illuminate your subjects, casting shadows and causing bright specular highlights on the reflective surfaces and smattering of dew drops.

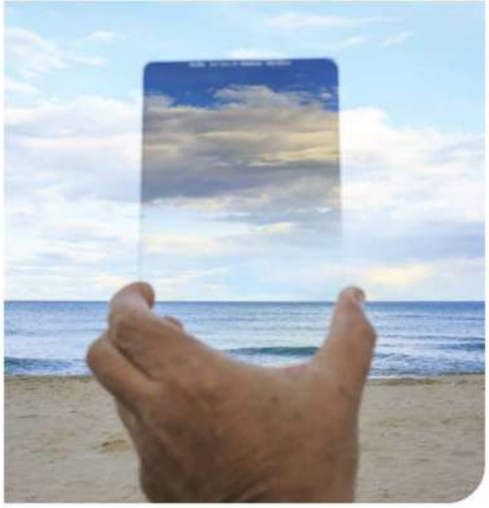
Get composed

If you and a group of friends are out walking in the woods and three of you are shooting away with your cameras, there is every chance your photos may all look quite similar. You need to set yourself apart from the crowd by thinking about making some bold compositional choices that the others might not have considered. Be brave and don't worry about making mistakes when it comes to your shots. Not every photo you take is meant to set the world on fire with its staggering compositional strength. The shots that don't work should be there as a learning tool for getting it right next time.



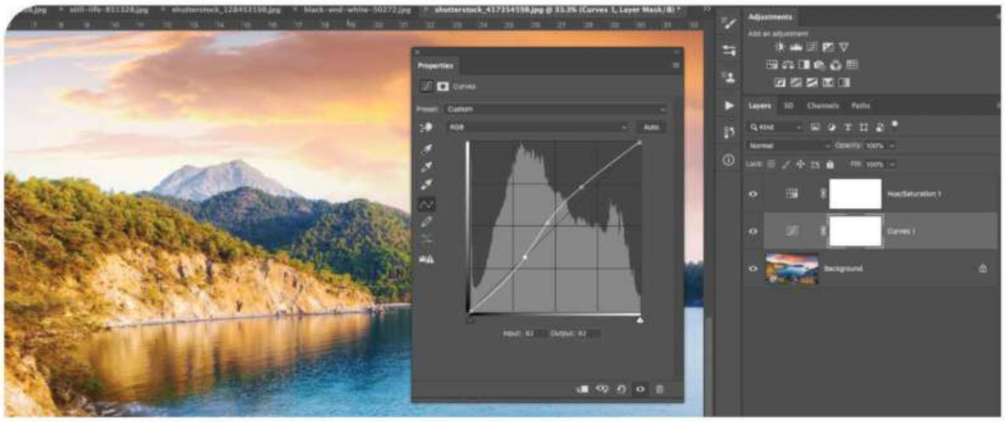
Shooting in fog

Learn how to control the underexposure issues faced when shooting very bright fog-covered scenes. Your camera's metering system can be confused by overly bright scenes and will try to average the scene as 18 per cent grey, or middle grey as it is known. By doing so, it will underexpose your shot by as much as 1 or 2 stops. Use your camera's exposure compensation feature and set it to overexpose by 1 stop or more to return the foggy scene to a better, brighter exposure. You can check your histogram too to confirm it isn't too dark.



Time to graduate

If your skies are full of pale grey clouds, or it is just much brighter than the ground, try using a graduated neutral density (ND) filter to bring some detail back into the sky. Cokin manufacture many filters for landscape work and the ND filter is probably one of the most useful. A 2-stop ND filter for instance, is dark at the top of the filter and gradually fades to clear towards the middle. When placed in front of your camera lens, the top half of the image is darkened by 2-stops and its effect is reduced to zero in the middle.

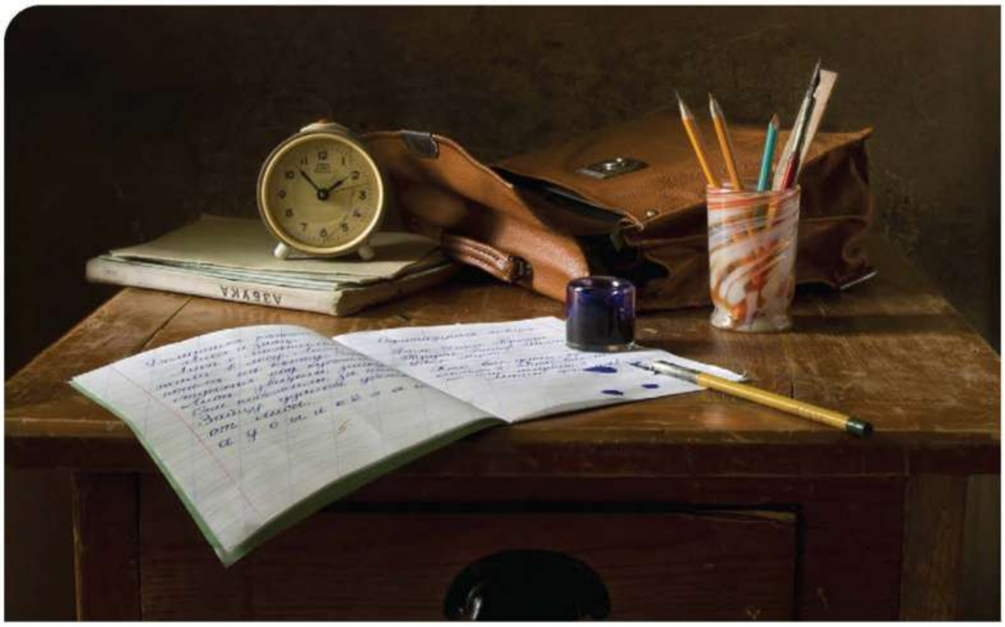


Photoshop mastery

If you use Photoshop, Elements or Gimp etc., learn one new technique each month that the pros use for improving a photograph, and master it. As an example, Photoshop's use of adjustment layers is critical in eking out every last pixel of detail from a landscape photo. It is also a non-destructive method whereby you do not alter the base image, so you can always go back to the original if you need to. Photoshop cannot make a badly composed, blurry image better or save you from bad technique but it can enhance a good shot and make it a 'wow' shot if done well.

Go mono

Stark landscapes and amazing weather conditions are ideal materials for black and white conversion. Indeed, many photographers like to shoot black and white images on dull days as a lot more detail can be revealed in the image when converted to mono. There are plenty of mono conversion methods you can learn to do in Photoshop. YouTube has countless tutorials that can aid you. We would recommend a third party app called Silver Efex Pro, which is part of the Google Nik collection. It is now completely free and many pros swear by it for their mono conversions.



Still life

Take the time to photograph still life objects indoors. You can start with something as basic as a sheet of white or coloured paper and a single lamp as your light source. Grab an object, it can be a bowl of fruit (we won't tell anyone, we promise!) or bunch of flowers, and spend time learning how the different positions of a single light affect the look of your still life and the shadows it creates. Then you can use pieces of white card as reflectors and bounce light back into the scene to fill in any dark shadows.

You are not alone

This is the key aspect that new photographers should keep in mind. Everyone has to start somewhere and everyone makes mistakes when they start out. Even when they become seasoned photographers, mistakes can still be made. Another key piece of advice we can give you is that you need to have fun with your camera. If mistakes happen, learn from them but don't let it put you off. Enjoy your camera and love your photography.

Be safe

If you are thinking of trekking out into the great outdoors, bear in mind that you need to plan your day, wear the appropriate hiking gear and make sure someone knows where you are going. Keep your phone with you and maybe even a GPS tracker. Dressing in layers is important but remember it's better to be too hot than freezing cold. Make sure you have all the gear you need. It would be pretty grim to arrive at an amazing location only to find you've left your memory cards behind, or your favourite wide-angle lens.

Taking care of your equipment

Both dust and fingerprints can ruin your pictures

> *"The most vital part of your camera is also the most delicate. If your lens is damaged then all your pictures will suffer."*

Like any item of complex technology, your digital camera will only keep working at peak efficiency if you look after it. Of all the abuse that a camera can suffer, perhaps the most pernicious is dirt. From dust on the lens to grubby fingerprints all over the LCD monitor, dirt can seriously impair the operation of your camera. Of course, you can't chuck your camera in the sink with the washing up (you can, but don't expect it to work afterward), so just how should you keep it clean?

Lens cleaning

The most vital part of your camera is also the most delicate. If your lens is damaged then all your pictures will suffer. The first rule of lens care is to never touch the surface of the lens with anything that can scratch glass, which includes some rather unexpected things. For example, soft tissue papers, or toilet paper, are among the worst things you can use. Even the softest paper contains hard grit that will leave tiny scratches on the surface of the lens, which builds up over time. Don't use your pocket-handkerchief either. Even a clean one will contain dust and lint that can leave your lens dirtier than when you started.

Care should be taken when using cleaning fluids. The surface of your lens has a special coating, which can be damaged by spirit, or solvent-based cleaners and they can also seep around the edges of the lens and get in between the elements. It will then be impossible to remove without having the lens dismantled and professionally cleaned. Only use proper lens fluid and apply this sparingly to a lens cloth rather than directly to the lens.

Dust on; dust off

Don't wipe dust off with a tissue or cloth. Dust particles may include tiny grains of sand, which are extremely hard and will scratch your lens. The correct way to clean a lens is to remove any dust using a proper lens brush. You can also use a can of compressed air, or a blower. Don't blow on the lens with your mouth, because you'll inevitably get small droplets of saliva on it.

Only wipe the lens once the dust has been

A rubber pump dust cleaner is a very effective way of cleaning your camera lens without the risk of scuffing or scratching the surface.

ESSENTIAL CAMERA CLEANING KIT

Lens-Pen cleaning brush

This handy pen-sized gadget is available from all good camera shops and combines a soft brush with a special lens-cleaning pad.

Micro-fibre lens cloth

These soft micro-fibre cloths are the best way to clean your lens and come in a handy pouch that clips to your camera strap.

hama DIGI-KLEAR
hama

Camera cleaning kit

The perfect gift for any camera enthusiast, a good cleaning kit will include abrasive-free lens wipes, a blower brush, non-solvent cleaning fluid and more.

Optic-Papier

Dust-off air can

Ideal for getting rid of dust in hard-to-reach places with a blast of compressed air, this latest version is ecologically safer.

Dust Off
eco-superior
duster
225ml

removed. You can get special lint-free lens-cleaning cloths from your local camera shop and these are the only things you should ever use for this. Wipe the lens from side to side, never in a circle. A circular motion merely moves dirt around the lens without removing it. A word of caution about compressed-air blower cans. Always direct the first blast away from your camera, since it may include a small spray of condensation.

Monitor your LCD

Although scratches on your LCD monitor aren't as serious as scratches on your lens, they are still best avoided. You can get away with cleaning your monitor with a handkerchief or other soft dry cloth, but in general, anything that is good for your lens will also be good for your monitor. As with the lens, solvent or spirit-based cleaning fluids should be avoided. If the screen is particularly dirty, use a lens tissue with a little lens cleaning solution on it. Again, as with the lens, use a side-to-side motion rather than a circular one.

Dirty pictures

General dirt on the body of your camera should be removed with a soft dry cloth. It is OK to use a slightly damp cloth for stubborn grime, but make sure you dry it off immediately afterward. Do not use cleaning sprays or abrasive scourers as these will damage the finish and may get onto the lens, with disastrous results.

Moisture protection

Unless you have a weatherproof camera, moisture can get inside and mess with the electronics, or condense on the CCD or the inside of the lens and ruin your pictures. If, for example, rain splashes your camera, wipe it off at once with a soft dry cloth. It's also a good idea to keep a bag of silica gel in your camera bag. This substance absorbs moisture, sucking it out of the air. Keeping some with your camera will help keep it dry.

Keep in contact

With digital cameras, it is vitally important that the electrical contacts between the camera and the memory card are clean. If you get any dirt on them, it can prevent your pictures from being recorded. If you think that there may be dust on the contacts in your card slot, give it a quick blast with a compressed air can. If that doesn't work, it's probably best to have the camera professionally cleaned and serviced. Don't be tempted to try squeezing things like cotton buds or pipe cleaners into your card slot, since these stand a very good chance of permanently damaging your camera. ■

Glossary

Some photographic terms you may encounter, explained in more detail

AMOLED
Stands for active-matrix organic light-emitting diode. A new type of display technology used in mobile devices and televisions, used in the monitors of some digital cameras. Has several advantages over LCD, including using less power.

Aperture
Behind the lens of your camera is a movable circular iris which opens and closes to control the amount of light falling on the sensor. This is usually controlled by the light meter, although some cameras have a manual aperture control. Altering the aperture also changes the depth of field.

Aperture Priority
This is one of the semi-manual exposure options found on some cameras. The user sets the aperture according to the depth of field they require, and the metering system sets the shutter speed to obtain the correct exposure.

Artefacts
When an image is stored in your camera's memory it has to be compressed to fit, usually into a JPEG file, and in the process some information is inevitably lost. When the image is uncompressed for viewing, noise creeps in and appears as angular blocks in the image, which are known as artefacts.

Autofocus
Almost all digital cameras have automatic focusing. There are essentially two types; contrast detection, used in compact cameras and most CSCs, uses the camera's main sensor and works by detecting the borders between high-contrast areas and trying to make them as sharp as possible. Phase detection AF is used in digital SLRs and some CSCs, and uses a separate sensor. It is usually faster and works better in low light conditions.

AE Lock
Stands for Auto-Exposure Lock, a function found on most advanced digital cameras. This enables you to take a light meter reading from a particular part of the image and then hold that setting while you compose the image. Useful for dealing with back lighting and other difficult lighting situations.

Backlighting
Backlighting occurs when your subject is brightly lit from behind, such as somebody standing in front of a sunlit window. Unless you adjust the exposure to compensate for this, your subject will appear as a dark silhouette against the bright background.

Back-side illumination
Not to be confused with backlighting, this refers to a new method of sensor design. In conventional sensors the wires connecting the photocells of the sensor run over the front surface of the chip, reducing the light-collecting area. Back-side chips are made the other way up, so that the wires are on the back. Offers potentially better low-light performance.

Barrel distortion
Barrel distortion occurs when a wide angle lens distorts an image so that it appears slightly spherical. If you take a seascape with a wide-angle setting and notice that the horizon seems to curve, this is barrel distortion. It's most noticeable when there are straight lines near the edge of the frame. In digital images barrel distortion can be corrected in image-editing software.

Bracketing
Bracketing shots is where a photographer takes the same shot three times or more, each at different exposures. This increases the chance of getting an ideally exposed image. Also, it's possible to combine the shots in software to increase the light and shade within the image, which is essentially how HDR works.

Burst mode
Many cameras offer a burst mode, which means they can take several images in rapid succession, just as you'd get with a motor-wind on a traditional film camera. The number of shots that can be taken is limited by the speed of the camera's image capture and processing systems, as well as the size of the internal memory buffer. You'll typically get about three frames per second from a standard digital camera in burst mode.

Centre-weighted metering
This is when the camera takes an average light reading from the whole frame, but pays more attention to the centre of the image where the subject normally is. This has been largely superseded by multi-pattern metering, which is better able to cope with unusual situations.

CCD
Stands for Charge Coupled Device. This is the light sensor behind the lens of your camera that records the image when you take a photograph. It consists of a grid of millions of tiny light sensors, one for each pixel of the image. The size of a CCD is measured in megapixels, and the higher the megapixel rating, the better the image quality.

Chromatic aberration
Coloured fringes that appear around objects, often toward the edges of the frame. Caused by light rays of different wavelengths coming to focus at different distances from the lens. Better quality lenses seek to minimise this by the use of special coatings and lens designs. Can be corrected by software after the picture is taken.

CMOS
Stands for Complimentary Metal-Oxide Semiconductor. A chip-manufacturing technology used to produce the sensors in an increasingly large proportion of digital cameras. Cheaper but with better tolerance than other methods.

Depth of field
When you focus your camera on a subject, some detail behind and in front of the chosen subject will also be in focus. The distance between the nearest and furthest in-focus objects is known as the depth of field. It is changed by altering the size of the aperture – the smaller the aperture, the larger the depth of field.

Digital zoom
Some cameras give you the option of zooming in on the centre part of an image by expanding it in the camera. Although the zoomed area looks bigger, it still contains the same number of pixels as it did originally, so it will appear blocky and will lack resolution. This is not to be confused with optical zoom, which is far superior.

Dynamic range
The difference between the lightest and darkest areas of an image. If a camera can simultaneously capture shadow and highlight detail then it has good dynamic range. Few cameras can do both but they are improving all the time.

DPI
Stands for Dots Per Inch. The sharpness of an image produced by a printer is defined by how many dots of ink per inch of printed paper its print head can produce. A figure of 1,200dpi or higher is usually required for high quality results, although most modern printers are capable of this.

Effective pixels
Although your digital camera may claim to have 13.6 million pixels on its CCD, some of that number will not be used for taking the picture. Usually, some pixels around the edge of the sensor are painted black to provide a colour balance, while others fall outside the range of the lens.

Electronic viewfinder
Some cameras have a viewfinder containing a miniature LCD monitor showing you what the camera sees. This usually uses less battery power than the LCD screen on the back of the camera, but can be a strain on the eye and difficult to focus.

Exposure
When you take a picture, the camera determines how long the shutter should be open for and how wide the aperture should be, thus obtaining the correct exposure. If a picture is too dark, it is underexposed, whereas if it goes the other way and is too light, it is then referred to as being overexposed.

External flash
This means that the camera has a connection, usually a hot-shoe, that enables you to use a flashgun other than the one built into the camera. This allows a lot more creative freedom and control over lighting, because the flash can be positioned further away from the camera. This feature is only usually available on more expensive or professional-quality cameras.

EXIF
The Exchangeable Image File (EXIF) format is used by nearly all digital cameras that output pictures as JPEGs. It enables information, such as the GPS co-ordinates, date and time the shot was taken, plus exposure and other camera information, to be stored in the image file alongside the normal picture information.

Fixed focus
Cheaper cameras have fixed-focus lenses, which means they cannot be adjusted. Instead they rely on a very narrow aperture to make everything appear in focus, from a few feet in front of the camera out to infinity. They are fine for snapshots at average distance in good light, but are not so good for creative photographs where focus can be used to produce unusual effects.

Focal length
In brief, this term describes the magnifying power of the camera's lens. The longer the focal length, the greater the magnification. Conversely, the smaller the focal length, the more wide-angle the lens. Most digital camera zoom lenses can vary between short and long focal lengths.

f-number
This is the number which describes the ratio of the aperture of a camera's lens to its focal length. Generally, a higher quality lens will have a smaller f-number, which bizarrely means a wider maximum aperture, and thus more light entering the lens.

HDR
A rather over-used technique whereby several shots at different exposures are combined to produce one image capturing a very wide range of contrast, or dynamic range. Useful for high-contrast lighting and night-time shots, but can be over-used by art students who've just discovered it.

Histogram
A histogram is a graph of brightness. It ranges from black through grey to white along the horizontal axis, while values in the vertical axis represent the number of pixels at the appropriate brightness. It provides a means of checking the exposure of an image. If too many pixels are present at the left-hand side of the histogram, the image is underexposed, while if it's weighted to the right, then it's likely to be overexposed.

Interpolation
Some cameras and image-editing software can increase the size of a digital image by adding extra pixels in between the original ones. They take an

average of the pixels around the new one and attempt to match the colour and brightness to create a seamless image. Some systems give better results than others.

ISO
Stands for International Standards Organisation. In conventional photography, the ISO number is a measure of the light sensitivity of photographic film, and this has been carried over into digital photography as a way of expressing the light sensitivity of the CCD.

Jaggies
'Jaggies' refers to jagged diagonal lines that appear in a low-resolution picture. Pixels are square, so if large pixels are being used to represent a diagonal, you'll be able to see the corners of each, creating a saw-like edge. Anti-aliasing is used to soften jaggies, whereby the software will attempt to calculate 'in-between' shades to blur the line a little and make it look a lot smoother.

JPEG
This file type stands for Joint Photographic Expert Group, and is the most commonly used system of image compression. Using a sliding scale between file size and picture quality, it enables digital cameras and computers to squash a large picture into a small amount of memory. Be careful when compressing files, though, because too much compression will reduce the quality of your image.

Landscape mode
A program exposure option found on many mid-priced cameras, this function automatically selects the best exposure settings for taking landscape photographs, usually a longer shutter speed and the narrowest possible aperture to maximise depth of field. It can also refer to holding the camera horizontally, which is usually preferred for landscape shots.

LCD
Stands for Liquid Crystal Diode, a display technology first developed in the 1970s, and in widespread use today. Most cameras have an LCD monitor screen mounted on the back for viewing photographs. Some also have an LCD electronic viewfinder, and some DSLRs also have a separate LCD data display panel.

L-ion
Stands for Lithium Ion. This is the latest kind of rechargeable battery, superior even to Ni-MH. It can hold more power, and does not suffer from 'memory effect', where a partially charged battery, when recharged, will only register the additional charge rather than its full capacity.

Macro mode
This traditionally refers to a lens that can focus closer than its designated focal length, but these days it is used to describe any facility for taking extreme close-ups.

Manual mode
This is for experienced photographers only. It gives you full control over both aperture and shutter speed, enabling you to experiment with exposure and depth of field. Essential for any creative photography.

Megapixel
Megapixels are a measure of the size and resolution of the pictures that a digital camera can produce. Mega means one million, and in this case a million pixels, or more accurately a million individual light sensors on the camera's CCD. The more megapixels, the better.

Memory card
Most digital cameras store your pictures on removable cards full of computer memory. They come in a variety of sizes and there are several different types, including CompactFlash, SD and MicroSD cards as well as Sony's own Memory Stick format.

Metering system
This is how the camera measures the amount of light being reflected by whatever you are trying to photograph, to determine the correct exposure for that particular scene. There are many different types, including spot metering, multi-pattern metering and centre-weighted metering.

Multi-pattern metering
This is a sophisticated means of determining the correct exposure of a photograph. The camera takes light readings from several different areas of the frame and compares them to its pre-programmed data to determine the right exposure. The idea behind this is that bright light sources, such as the sun or brightly lit windows, won't cause the rest of the image to be underexposed.

Night-time mode
A program exposure mode that compensates for low light by setting the aperture to maximum. This lets the most available light into the camera and gives the fastest possible shutter speed under the circumstances.

Ni-MH
Stands for Nickel-Metal Hydride, a type of rechargeable battery rapidly replacing older Nickel Cadmium (NiCad) batteries. Ni-MH batteries do not suffer from the 'memory effect' which was a problem with older rechargeables, and they can also store a lot more power. This makes them ideal for use in battery-guzzling digital cameras.

Optical zoom
With recent advances in lens manufacturing technology, many digital cameras now have small but powerful optical zoom lenses. This means they can be adjusted to magnify the image (zoom in) or to capture a wide-angle shot (zoom out). Because the image uses the full capabilities of the CCD this is preferable to digital zoom.

Pixel
Short for Picture Element. If you enlarge a picture on your computer, you will see that it is made up of tiny squares of a particular colour and brightness called pixels. A pixel is the basic building block of a digital photograph, and there can be several millions of them in an image. The higher the pixel count, the better the quality of the photograph.

Portrait mode
This is a program exposure mode that optimises the camera for taking classical portrait shots, widening the aperture to minimise the depth of field. This ensures that only the subject is in focus, while the shutter speed is increased to minimise camera shake.

Processor
All digital cameras have an image processor, which takes the data from the sensor and turns it into the finished JPEG image that you see on the screen. A faster processor means larger resolution images can be processed more quickly, improving the camera's performance.

Program exposure
Found on most digital cameras, program exposure is an automatic setting where the camera's metering system selects an appropriate aperture setting and shutter speed in an attempt to get the best exposure and performance out of the lens.

RAW
RAW mode is found on most high-end digital cameras. It is an option which stores the uncompressed raw data from the sensor, which can then be processed on a computer using software such as Adobe Camera Raw, Bibble etc. Raw files contain more information than JPEGs, and take up more memory. Raw is actually not an acronym and so shouldn't be all capitals; it should really be written simply as "raw".

Resolution
The more pixels there are in an image, the sharper that image will be. This is the resolution of the picture, and is usually expressed as two numbers representing the height and width of the image in pixels, such as 3,872 x 2,592. Multiplying these two figures gives you the effective megapixels, in this case 10.03MP.

Shutter
The shutter is a device behind the lens of the camera which is normally closed, but opens for an instant when a picture is taken to allow light into the camera and onto the CCD. The length of time the shutter is open for is determined by the metering system, and is known as the shutter speed.

Shutter lag
This is a problem found on many digital cameras. Because of the way they work, there will often be a slight delay between pressing the button and the camera actually taking the photograph. The latest camera designs have reduced this problem a great deal, so check this when buying a new camera.

Shutter Priority
This is a semi-manual mode that enables the photographer to specify a shutter speed while the camera's metering system sets the aperture for the correct exposure.

SLR
Stands for Single-Lens Reflex. A mirror or prism reflects the light coming in through the lens to the viewfinder, so when you look through it you see exactly what the camera sees.

Spot metering
Found on the more expensive cameras, this metering mode enables the photographer to take a light reading from a small area in the middle of the frame, usually marked in the viewfinder. This is the best way of dealing with difficult lighting conditions such as backlighting, and is normally used in conjunction with auto-exposure lock.

Time lapse
We've all seen films of flowers opening at incredible speed, or the sun and clouds racing across the sky. This super-fast motion technique is called time-lapse photography, whereby a stationary camera takes several successive shots at time intervals of a few seconds, minutes or even hours. The images are then played back rapidly, giving the impression of continuous motion.

VGA
Stands for Video Graphics Array, and refers to an image size of 640 x 480 pixels. This was once the standard size of a computer monitor output, but these days even mobile phones have larger displays. VGA is still sometimes found as an image size mode, particularly in the video recording modes of some cheaper cameras.

White balance
Most modern digital cameras automatically adjust the colour balance of the picture to compensate for any tints in the ambient light, such as sunlight, fluorescent strip lights or normal light bulbs. This is called a white balance, and means you can take a picture indoors without that orange tint you get with a film camera.

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